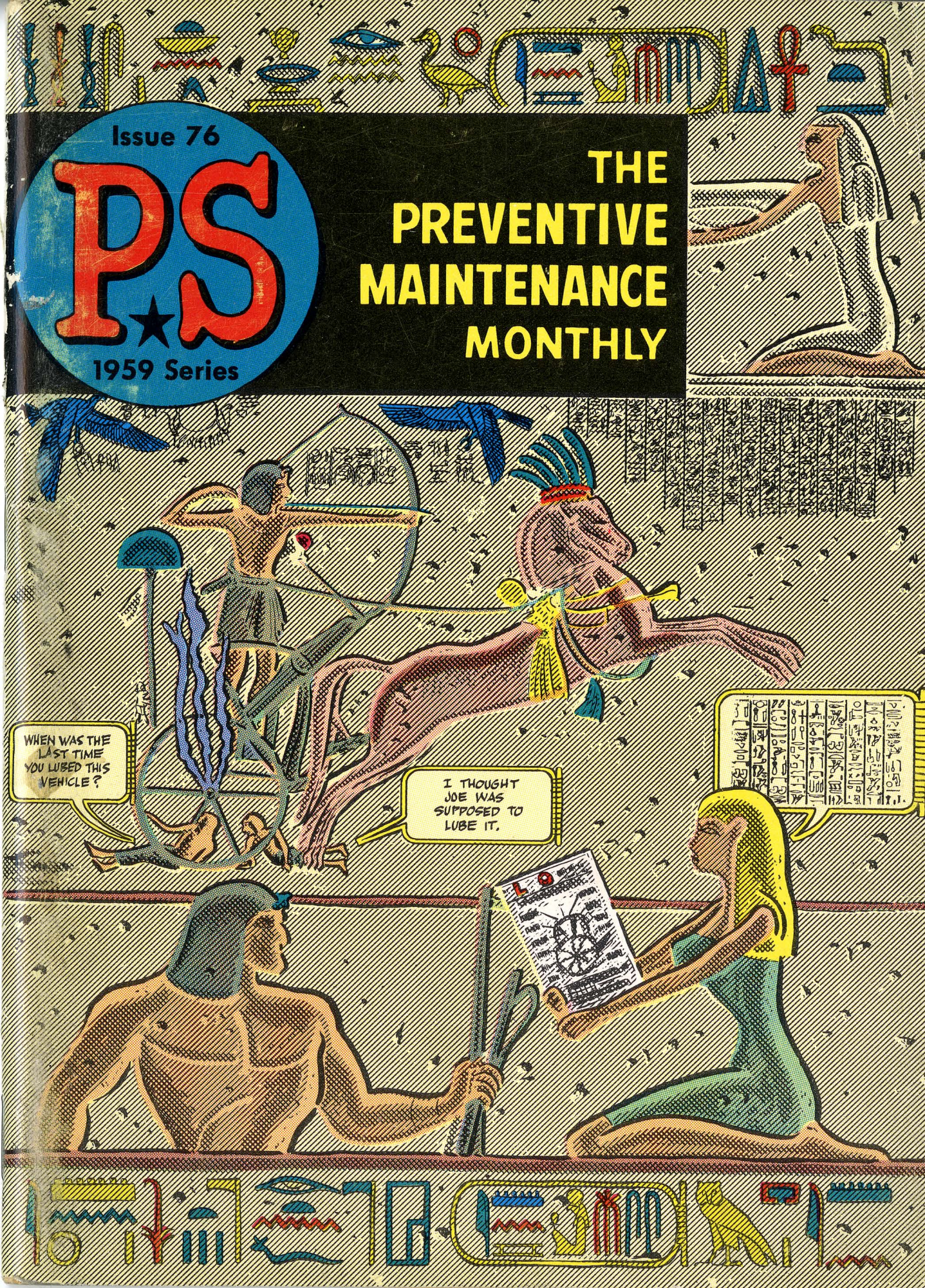
Issue 76
PS
1959 Series
THE PREVENTIVE MAINTENANCE MONTHLY
WHEN WAS THE LAST TIME YOU LUBED THIS VEHICLE?
I THOUGHT JOE WAS SUPPOSED TO LUBE IT.
L O

Lost your mnemonicon?
Never had one?

If your buddy's wondering how to spell that word, just tell him it's a gadget you use to remember things. It's like your TM which you use to remind yourself how to do the maintenance on your Army equipment.

In fact, your TM is a permanent memory of what you ought to know about the equipment you work on.

It's cram full of facts and figures you can't be expected to carry around in your head. In short, it's a written record, complete with pictures and diagrams and step-by-step ways to keep your equipment up to snuff.

You need your TM to learn what your equipment is, what it does, how it does it, and what you have to do to keep it that way.

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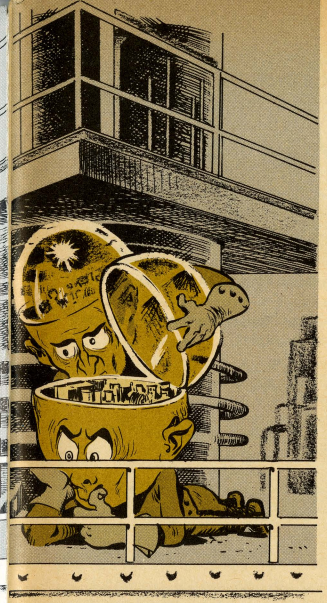
You heed your TM to get the best possible results the best possible way.

Your TM was written for you about your tank, your truck, your weapon.

Know what it says—about construction, operation, maintenance—and you'll be a wiser soldier.

Believe what it says, and you'll be a better soldier.

Heed what it says and you'll be a fighting soldier when the chips are down.



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Issue No. 76 1959 Series

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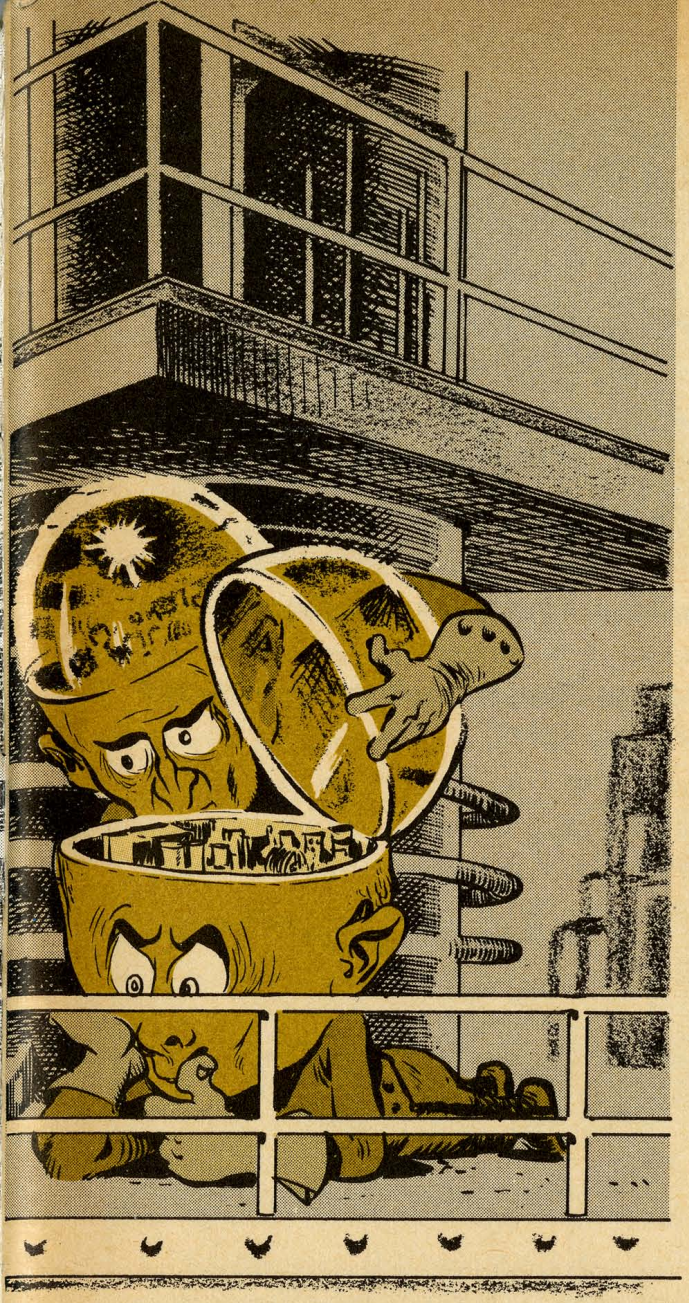

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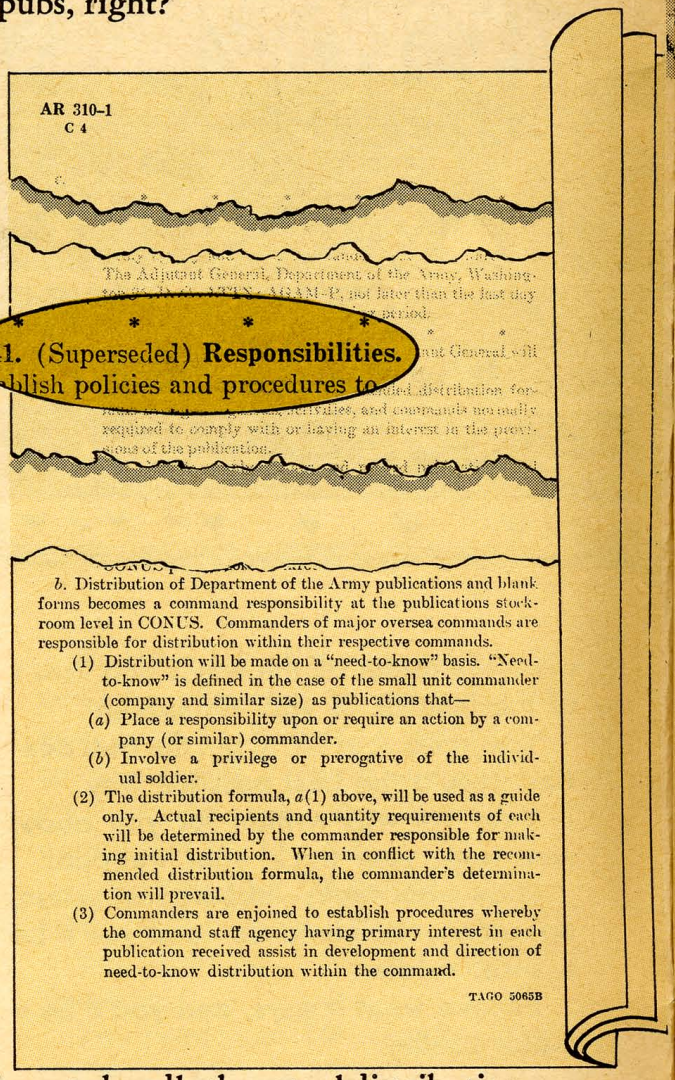
Being more interested in good maintenance and supply, you'd naturally worry first about how you were going to get your pubs, right?

That's why it's important for you to know about Change 4 (31 Mar 58) to AR 310-1 (15 May 56). It tells you who's in charge of the trail-breaking party making tracks toward your cabin with initial distribution of publications. The AR puts the job of trailblazer squarely on the shoulders of your post commander—if you're stateside; or your area commander—if you're overseas.



AR 310-1
C 4

41. (Superseded) **Responsibilities.**

b. Distribution of Department of the Army publications and blank forms becomes a command responsibility at the publications stockroom level in CONUS. Commanders of major oversea commands are responsible for distribution within their respective commands.

(1) Distribution will be made on a "need-to-know" basis. "Need-to-know" is defined in the case of the small unit commander (company and similar size) as publications that—

(*a*) Place a responsibility upon or require an action by a company (or similar) commander.

(*b*) Involve a privilege or prerogative of the individual soldier.

(2) The distribution formula, *a*(1) above, will be used as a guide only. Actual recipients and quantity requirements of each will be determined by the commander responsible for making initial distribution. When in conflict with the recommended distribution formula, the commander's determination will prevail.

(3) Commanders are enjoined to establish procedures whereby the command staff agency having primary interest in each publication received assist in development and direction of need-to-know distribution within the command.

TAGO 5065B

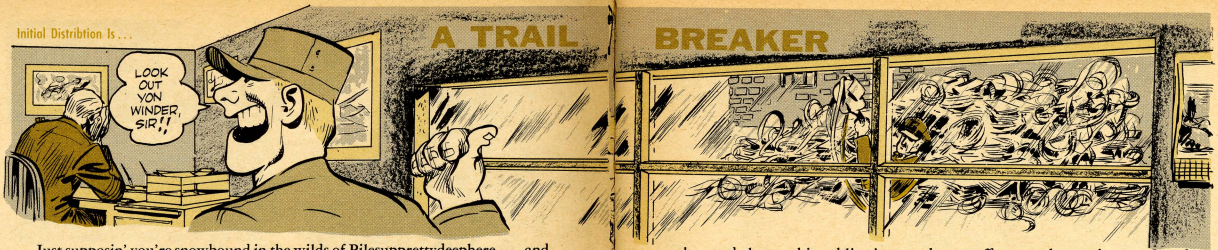
It even says your commander can make the final decision about **who** gets **what** and **how many** in the event his idea on who should get what conflicts with the distribution formula you find in a pub.

Naturally, he'd get a little winded trying to break trail all by himself. So, he asks his G4 to mush a path for him. Of course, your tech service people can come in handy as pathfinders on a deal like this, since they're in a good position to suggest what type of pubs your outfit needs to cover your mission and equipment.

This doesn't mean the tech service people have to handle the actual distribution. Since the responsibility for distribution is in your commander's hands, he can pass

Initial Distribtion Is . . .

A TRAIL BREAKER



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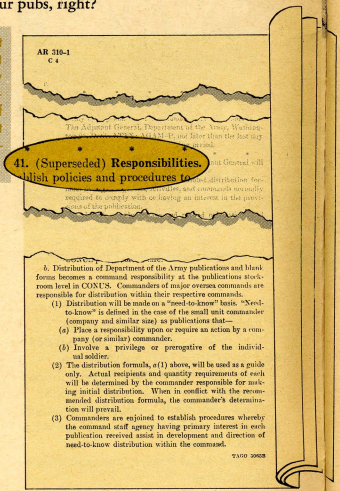

AR 310-1
C 4

The Adjutant General, Department of the Army, Washington ... AGAM-P, not later than the last day ... arrival.

* * * *

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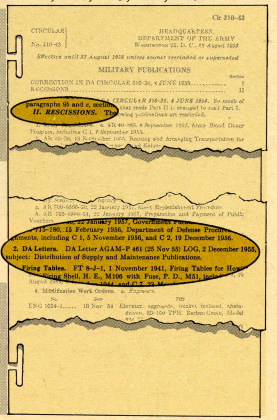
the word along to his publications stockroom officer on what to give you. So, when you decide you need more of a particular pub, you can send off a DA Form 17 (Requisition for Publications and Blank Forms) back along the same trail, to the nearest stockroom.

You may be interested to know that your stockroom, in turn, lets the publications depot know what you need by passing on the info with a DA Form 12 (Requirements for Publications) or DA Form 12-1, 12-2, 12-3, 12-4, 12-5.

It can happen that you're in need of a pub somebody up there didn't figure you could use when the distribution formula was being made up. You can take care of that situation by calling on your **need-to-know** definition, which is also in para 41 of AR 310-1. Using this as a basis for your justification, you can ask your local stockroom to give you copies of that pub.



Cir 310-43

CIRCULAR No. 310-43

HEADQUARTERS, DEPARTMENT OF THE ARMY
Washington 25, D. C., 22 August 1958

Effective until 22 August 1959 unless sooner rescinded or superseded

MILITARY PUBLICATIONS

CORRECTION IN DA CIRCULAR 310-36, 4 JUNE 1958 I
RESCISSIONS II

paragraphs 95 and c, section ... CIRCULAR 310-36, 4 JUNE 1958. So much of ... that reads Part II is changed to read Part I.

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a. AR 40-965, 8 September 1952, Army Blood Donor Program, including C 1, 8 September 1953.

b. AR 55-38, 13 November 1955, Renting and Arranging Transportation for ...

c. AR 700-6500-20, 22 January 1957, Stock Replenishment Procedure.

d. AR 700-6500-24, 22 January 1957, Preparation and Payment of Public Vouchers ... 22 January 1957, Government Furn...

... 715-180, 15 February 1956, Department of Defense Procur... ...ments, including C 1, 5 November 1956, and C 2, 19 December 1956.

2. DA Letters. DA Letter AGAM-P 461 (25 Nov 55) LOG, 2 December 1955, subject: Distribution of Supply and Maintenance Publications.

Firing Tables. FT 8-J-1, 1 November 1941, Firing Tables for How... Firing Shell, H. E., M106 with Fuze, P. D., M51, incl...

4. Modification Work Orders. a. Expenses.

No.	Date	Title
ENG 3024-1	10 Nov 54	Elevator, aggregate, bucket inclined, chain-driven, 80-100 TPH. Barber-Greene, Model ...

For instance, this here AR 310-1 calls for distribution of itself on a need-to-know basis down to and including **divisions**. Could be you've got a useful reason, though, for having this pub in your **company** or **battery** orderly room.

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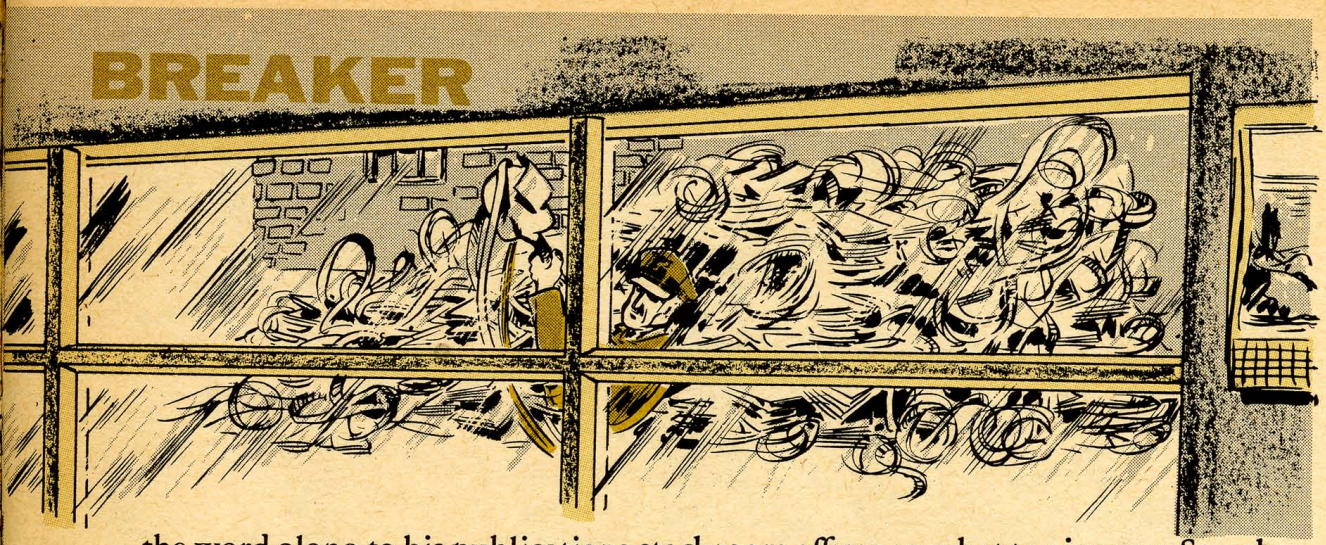
"Look out yon frosty window, Sir. Here comes the G4 now! They're shoveling out a tunnel from the stockroom through the snow and red tape."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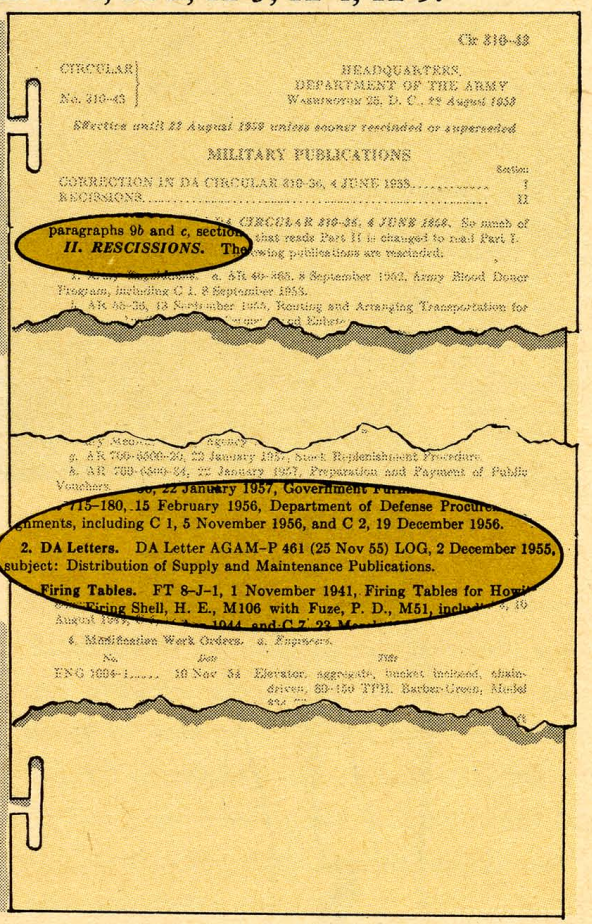
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The General Lubrication Story . . .

FACT AND

Firing a grease gun won't win a man many medals, but it'll knock out one of the worst enemies a mechanized Army has—friction. And that's a fact.

Friction, as any old top kick will tell you, is the resistance you get when one object is forced to move or slide over another one. Like when you're forced to

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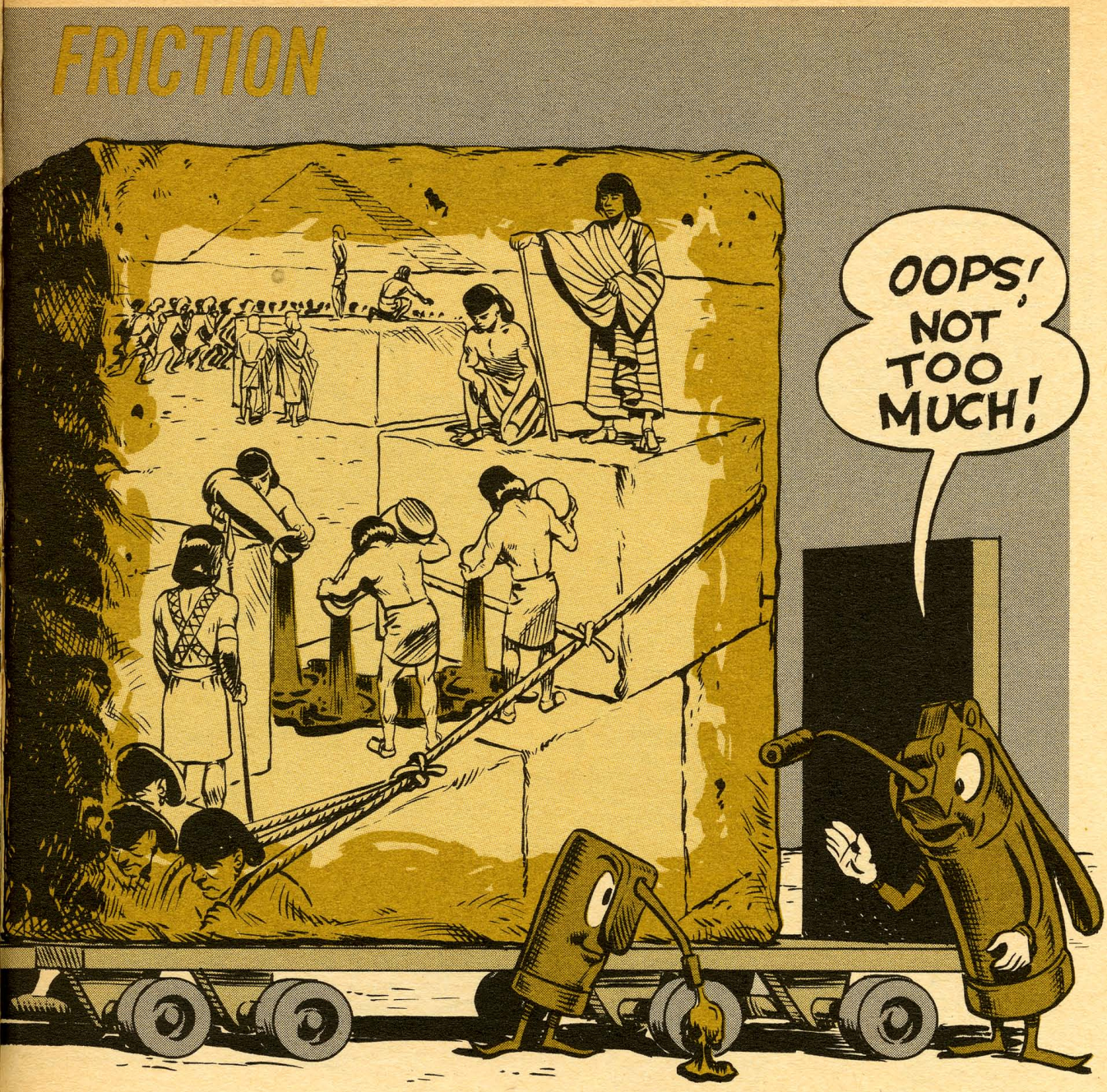
Friction, as any old top kick will tell you, is the resistance you get when one object is forced to move or slide over another one. Like when you're forced to slide out of the sack at 0400.

'Course, a little friction comes in mighty handy, sometimes, like in brakes. Or when you're walking on ice. But most of the time it's something you would just as soon do without.

To beat the forces of heat and friction, man long ago learned to use LUBES. Nothing on this earth can move very far or fast without lubrication—and that includes the human body. Which has an automatic, self-lubricating system, sealed at the factory and more or less guaranteed for a lifetime. Which is mighty nice, come to think of it. Imagine having an LO tattooed on you, and being required to pull in for a lube job every so often!

Speaking of tattoos, there's this one about the man who . . .

FRICTION



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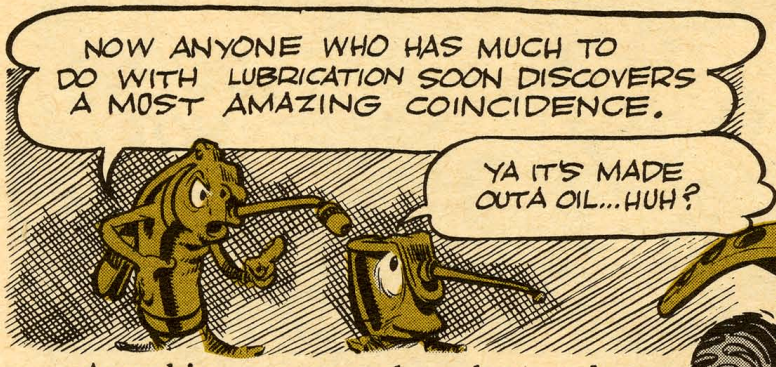
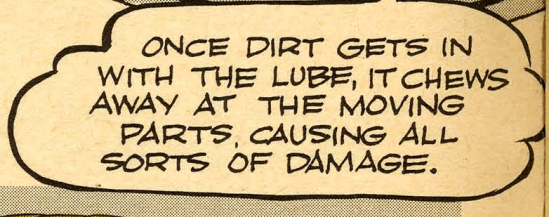
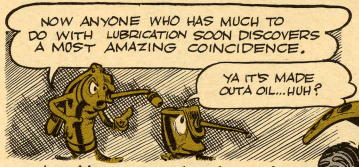


Any thing, part or place that needs lube the most can stand dirt the least. The most important lube point on any piece of equipment is always the last place you'd want any dirt or gook. Which brings up the first law of lubrication:

KEEP IT CLEAN



What's even worse, dirt can stop the flow of lubricant and bring everything to a screeching halt amid piles of ruined parts.



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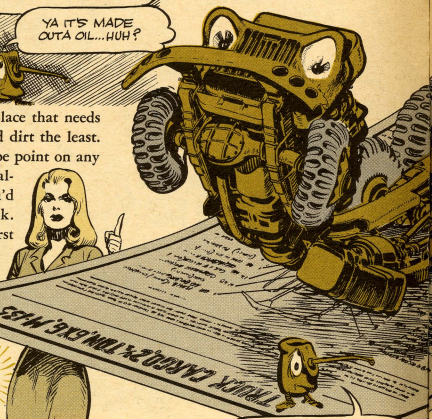

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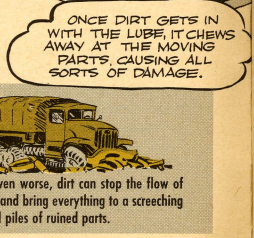

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So leave us look first at

CONTAMINATION

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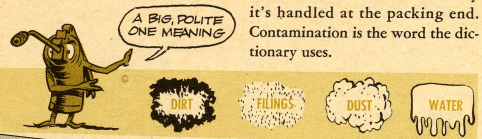
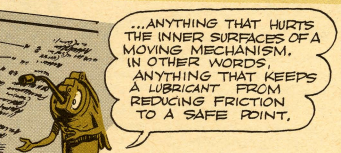
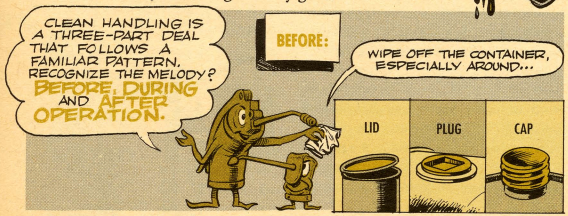




Now you've seen milk or cream that's gone sour. And you've seen things floating in it that didn't look like they belonged. Same with oil that's contaminated. It's off-color, with blotches and "impurities" floating all over. So a man just gives it the heave. Never use dirty, blotchy, broken-down lube.

Speakin' about the looks of lube, the first thing a man sees when he cracks the lid of a fresh can of grease is a thin film of oil. Only one thing to do—drain off the oil. It won't do you or the grease any good.



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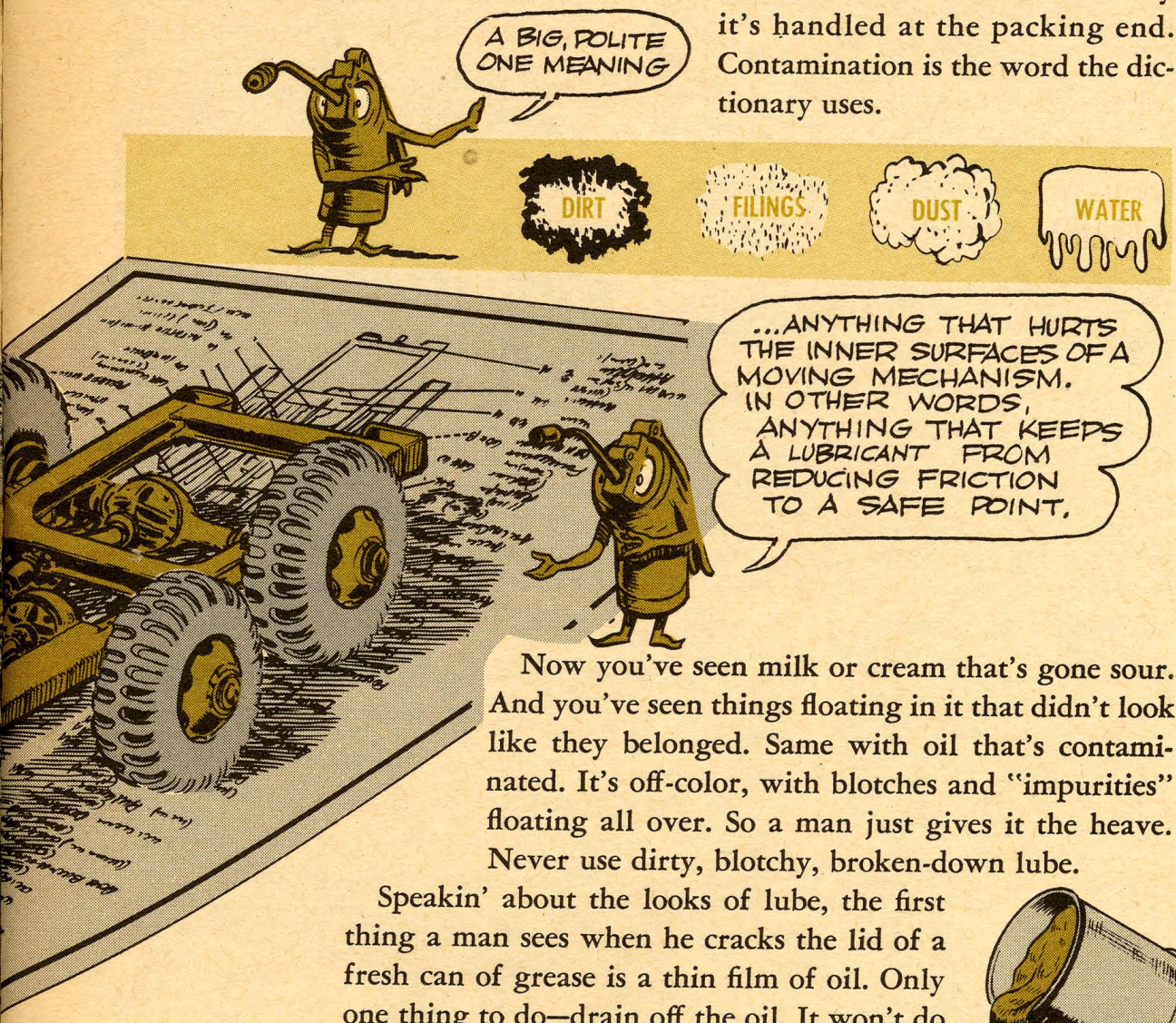
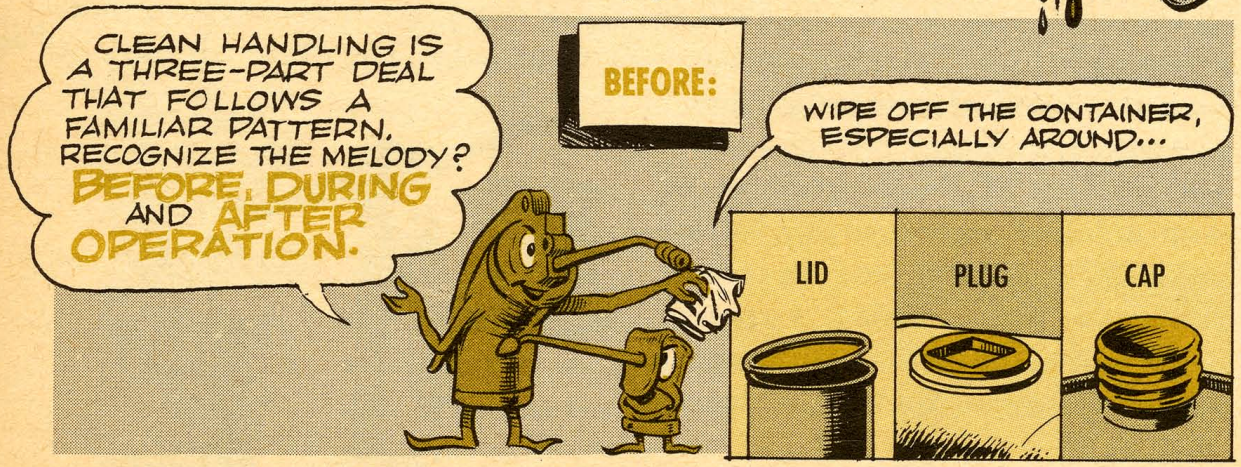
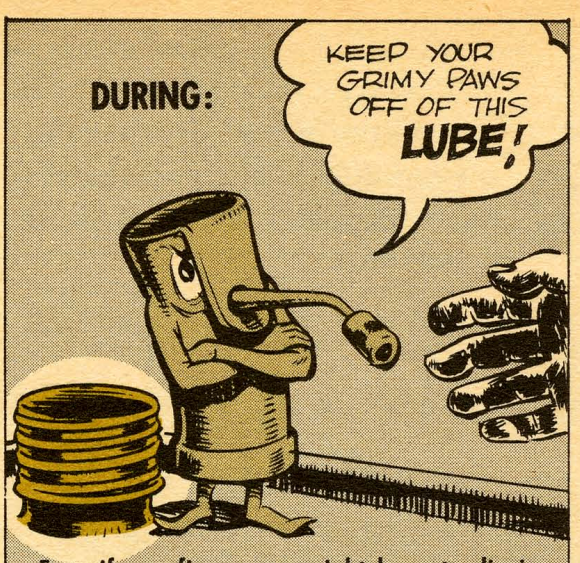


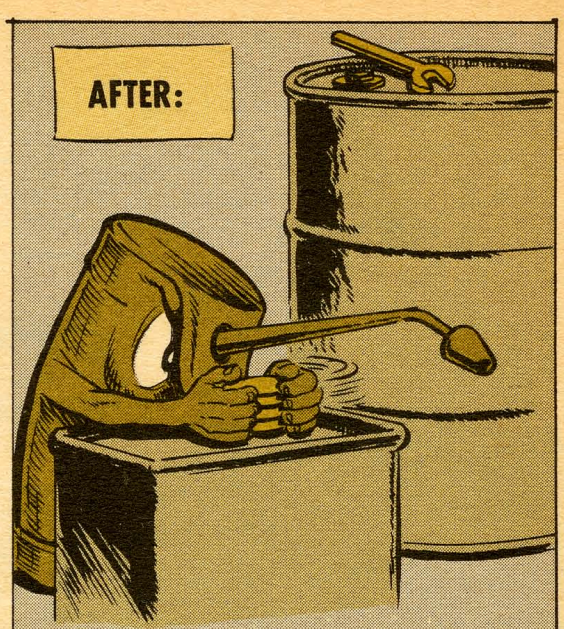
Now you've seen milk or cream that's gone sour. And you've seen things floating in it that didn't look like they belonged. Same with oil that's contaminated. It's off-color, with blotches and "impurities" floating all over. So a man just gives it the heave. Never use dirty, blotchy, broken-down lube.

Speakin' about the looks of lube, the first thing a man sees when he cracks the lid of a fresh can of grease is a thin film of oil. Only one thing to do—drain off the oil. It won't do you or the grease any good.





Even if you figure you might have to dip in for extra lube during a session, keep the container closed, high and dry. Some old buddy with sand or sawdust on his paws might accidentally foul up the deal. Close it almost as tight as if you were finished with it.

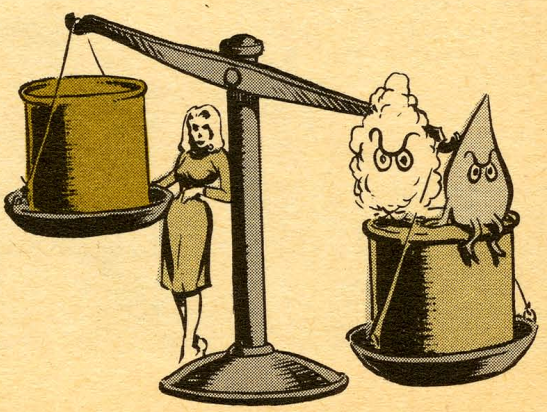


Same goes here, only more so. If you're wrestlin' with a drum, snug up the plug or cap wrench-tight. In the case of a can, hand-screw it as tight as you can.

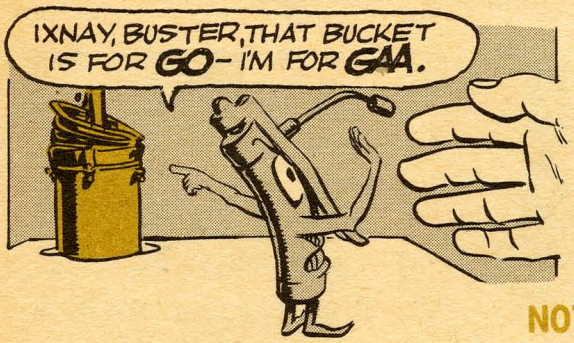
Now two of the toughest characters who ever snooped a motor pool, or sneaked into a shop, go by the innocent names of moisture and water. They're brothers under the lube-can lid, though, when it comes to upsettin' operations.

They work slow and steady, night and day, trying to get in. Nature lends them a helping hand by changing humidity and temperature. They'll use any tactic to keep grease and oil from being "pure."

And purity (amen) is really a virtue with a capital "P" when it comes to oils with additives. Seems there's a balance between the additives and the oil that can't take much upsetting. A trace of water will tip the scales and make the oil as useless as a crankcase without a plug.



Socially speaking, most lubes are flops. They're just not good mixers. They do their best work by themselves, and like to be kept and stored that way. The idea, of course, is to keep your GO90, GL, OH, etc., in their own buckets, cans and guns. Use the same container for the same lube right down the line. Especially so in the case of GAA, Am 2 and Am 3. It should have the same bucket and gun (lubricator) every time.



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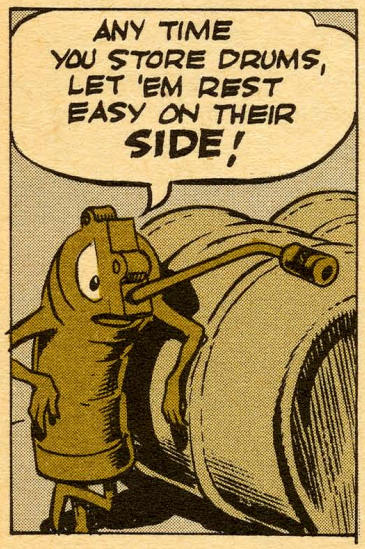
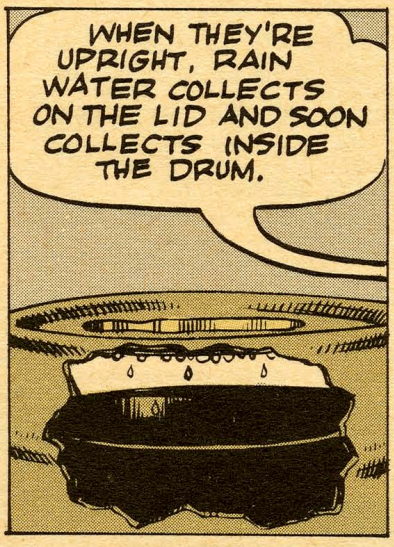
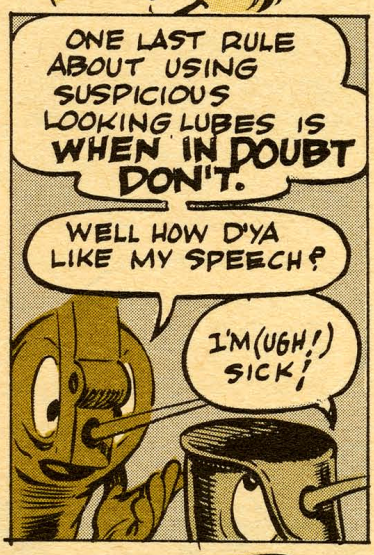
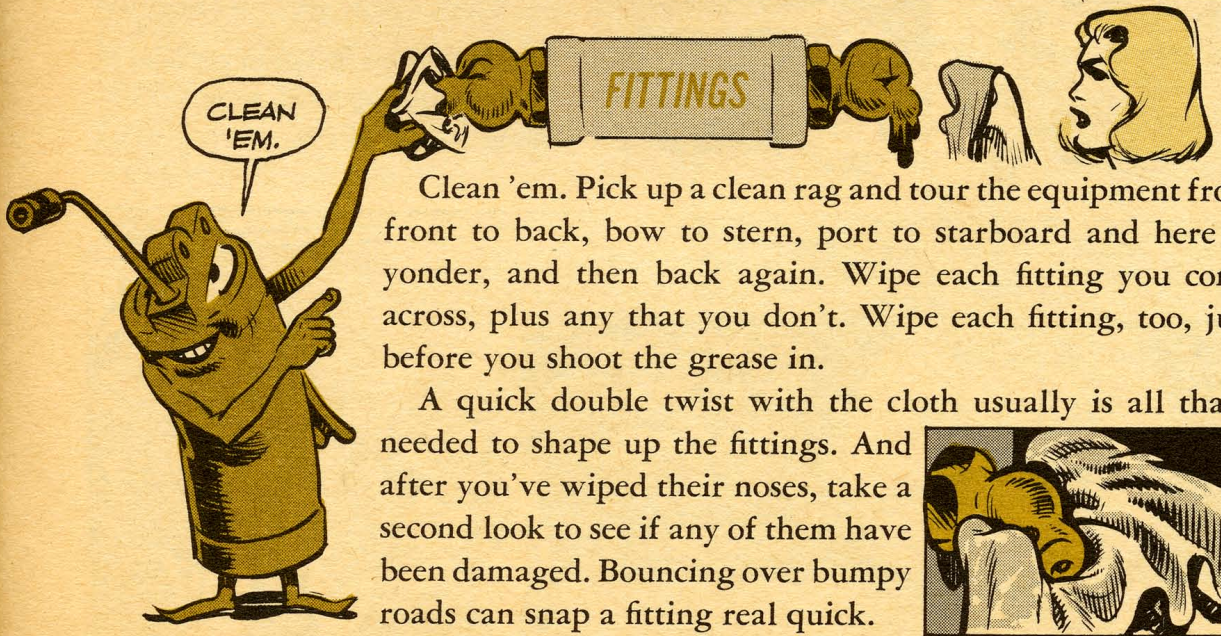


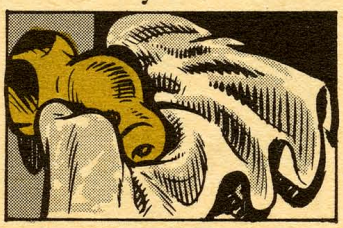






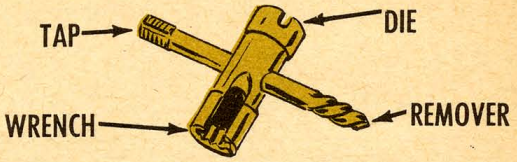
Clean 'em. Pick up a clean rag and tour the equipment from front to back, bow to stern, port to starboard and here to yonder, and then back again. Wipe each fitting you come across, plus any that you don't. Wipe each fitting, too, just before you shoot the grease in.

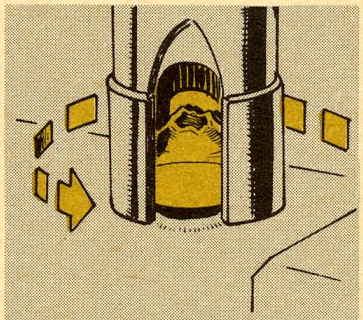
A quick double twist with the cloth usually is all that's needed to shape up the fittings. And after you've wiped their noses, take a second look to see if any of them have been damaged. Bouncing over bumpy roads can snap a fitting real quick.



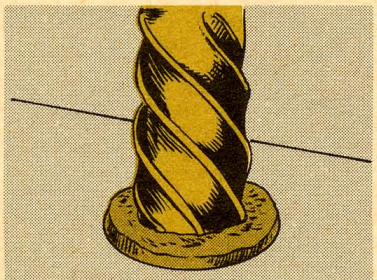
If a man finds a busted fitting, his "easy out" tool stands ready to yank him out of trouble. Its formal name is Lubrication Fitting Tool (FSN 5120-246-2311). Every second echelon tool set stocks one.

This puller really is four gadgets wrapped up in one. It consists of a tap, die, wrench and remover.

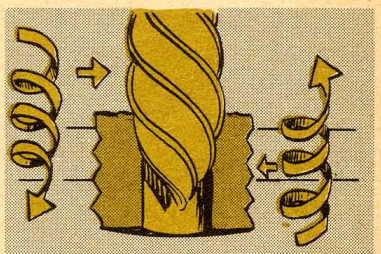




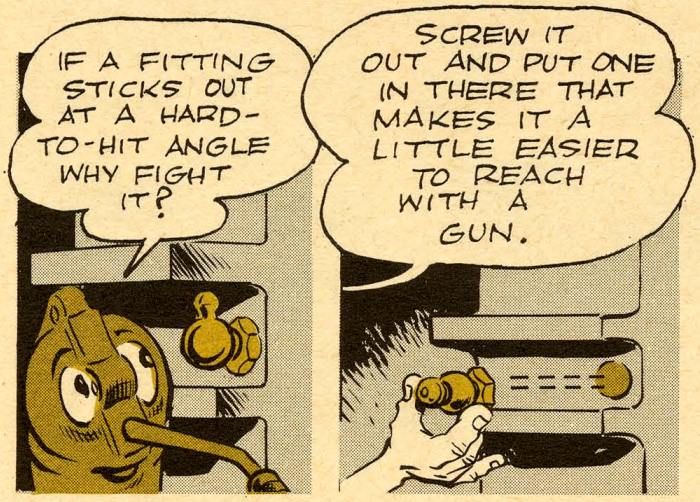
If only the top of the fitting's nose is snapped (outside the nut) a few turns of the wrench will screw out what's left.

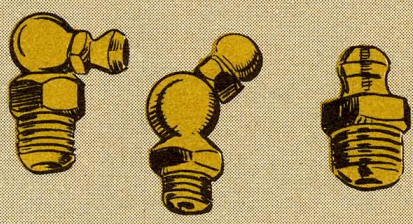


Minor surgery is needed if the fitting snaps below the nut. Poke the remover into the hole and start turning counterclockwise.

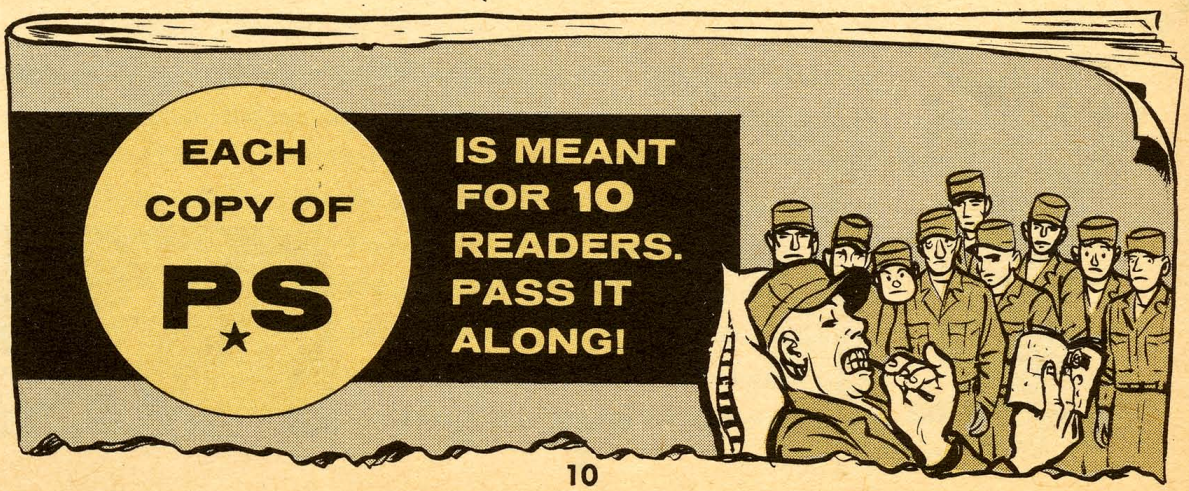


Watch it now. Two things happen at once. The reverse drill cuts into the broken plug and at the same time begins unscrewing it. All you need are a few twists—and out comes the plug.

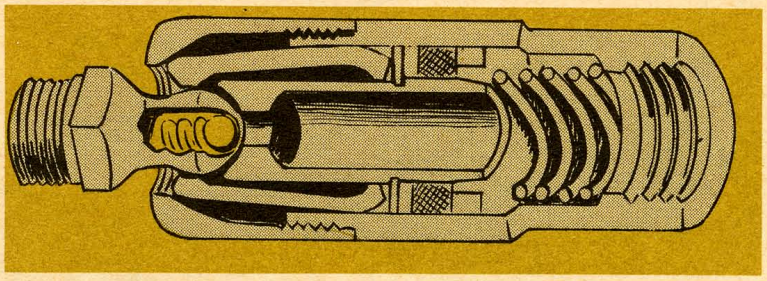




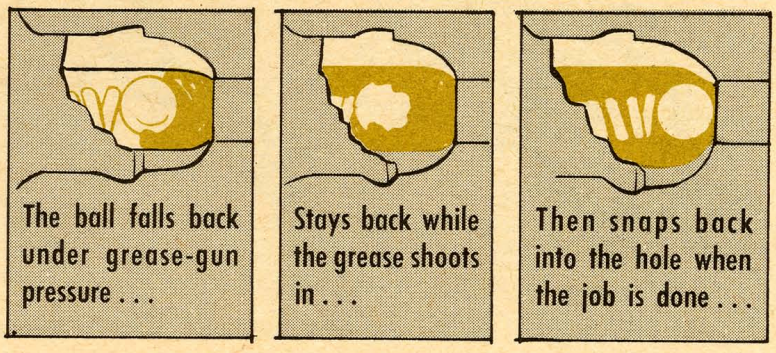
Most fittings are looking at you from about three angles—90 degrees, 45 degrees or straight-on.



A while back the answer to a luber's prayer came down the line in the shape of the old standby: the Standard Military Fitting. And with it came a new-type coupler.



This fitting has a ball check-valve (spring-loaded) in the head so grease won't work out and dirt won't work in. The ball falls back under grease-gun pressure—stays back while the grease shoots in—then snaps back into the hole when the job is done.

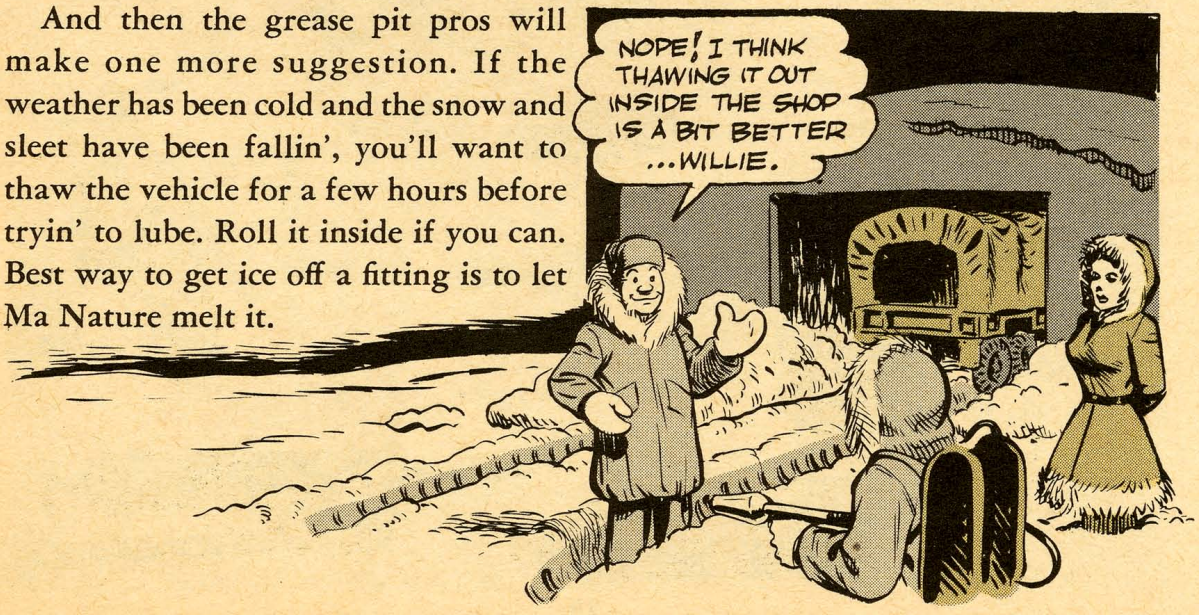


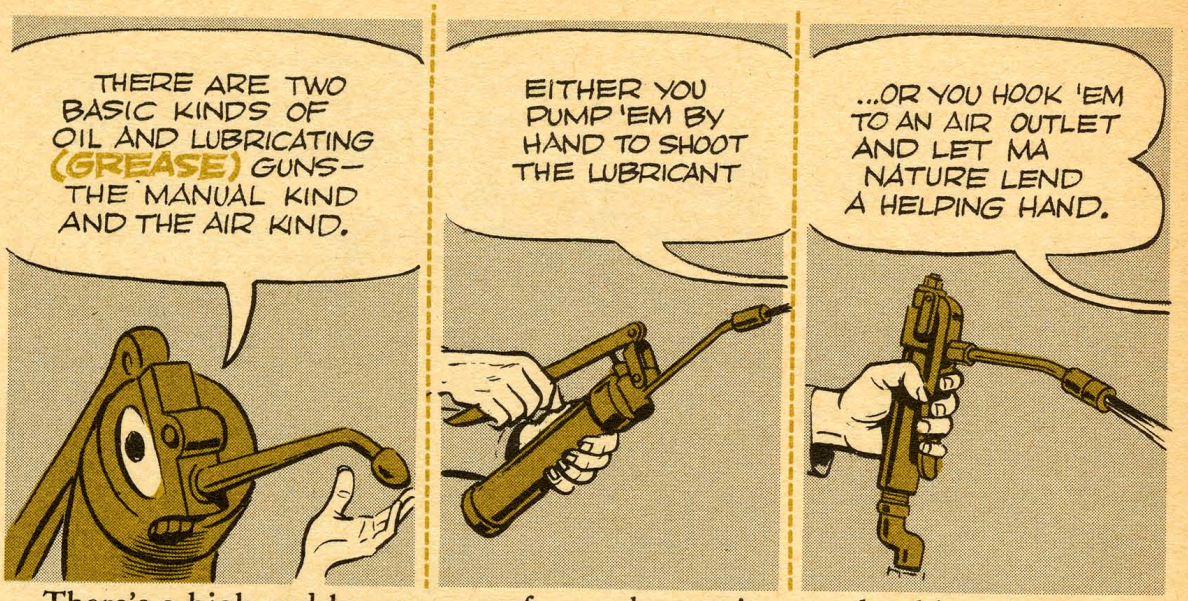
These fittings are precision made to do a tricky, vital job. Treating them with that little thought in mind will go a long, long way toward keeping them in action.

Still, certain lube points are a little like that slightly over-weight female shopping for a new outfit. They need a special fitting. Keep an eye open for 'em and pick the right gun to use on 'em.

When the time comes for a vehicle to take its lube, the old pros around a grease pit will drop one word of advice about the last pre-lube check: Take the load off. Why try to lubricate a vehicle that's sagging under many pounds of cargo. Get as much weight off the springs and joints as you can.

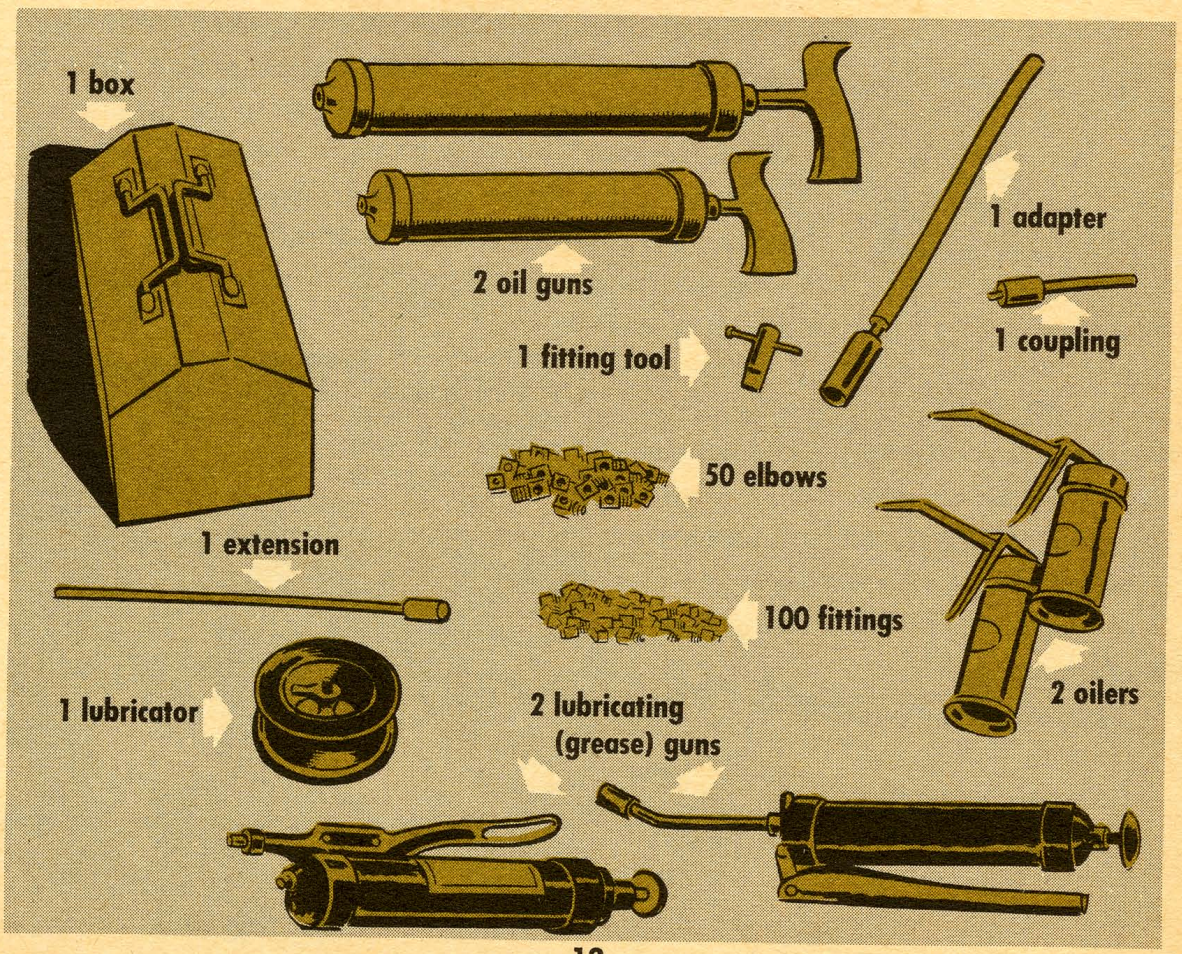
And then the grease pit pros will make one more suggestion. If the weather has been cold and the snow and sleet have been fallin', you'll want to thaw the vehicle for a few hours before tryin' to lube. Roll it inside if you can. Best way to get ice off a fitting is to let Ma Nature melt it.





There's a high-and-low-pressure factor thrown in to make things interesting. What a man finds in his Lubrication Kit (FSN 4930-357-6301) is pretty much what he'll need to keep the wheels and treads turning.

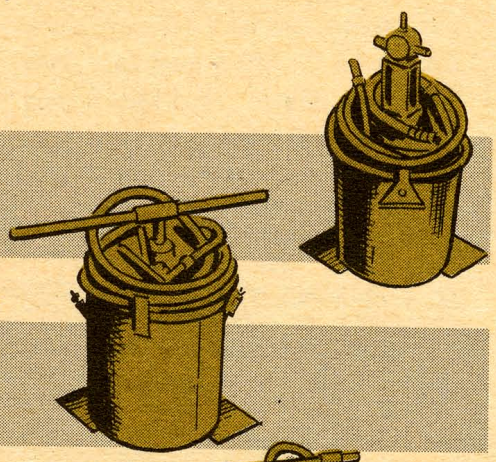
That kit is part of the Second Echelon tool sets. It includes:



Backing these up are the bigger, floor-type pump buckets with a larger capacity. They're also in the Second Echelon tool sets . . .

LUBRICATING UNIT (FSN 4930-704-3917),

Power Operated: high pressure, 25 to 50 lb cap, w/3/8 in ID x 10 ft lg hose assy (formerly GUN)

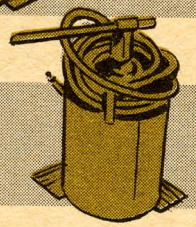


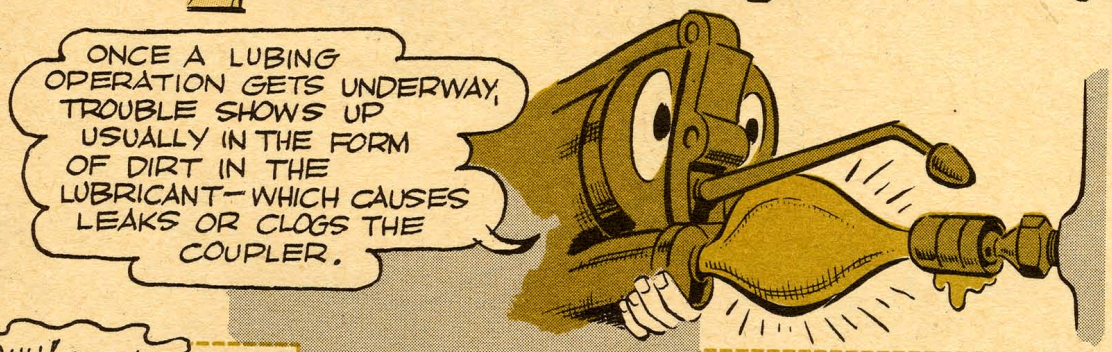
PUMP, BUCKET, LUBRICATING (FSN 4930-244-4859),

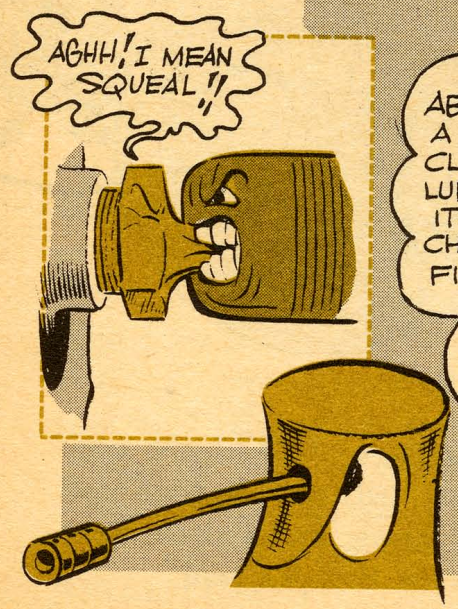
Hand operated, high pressure, 25 to 50 lb cap, w/3/8 in ID x 10 ft lg hose assy (formerly GUN)

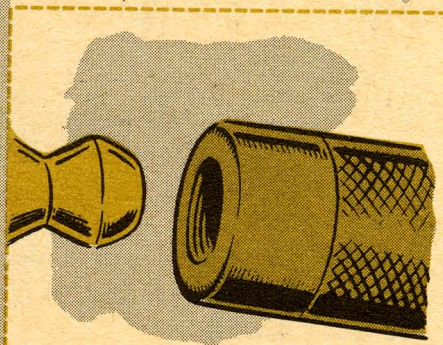
PUMP, BUCKET, LUBRICATING (FSN 4930-244-4860),

Hand operated, low pressure, 25 to 50 lb cap, w/3/8 in ID x 5 ft lg hose assy (formerly GUN)

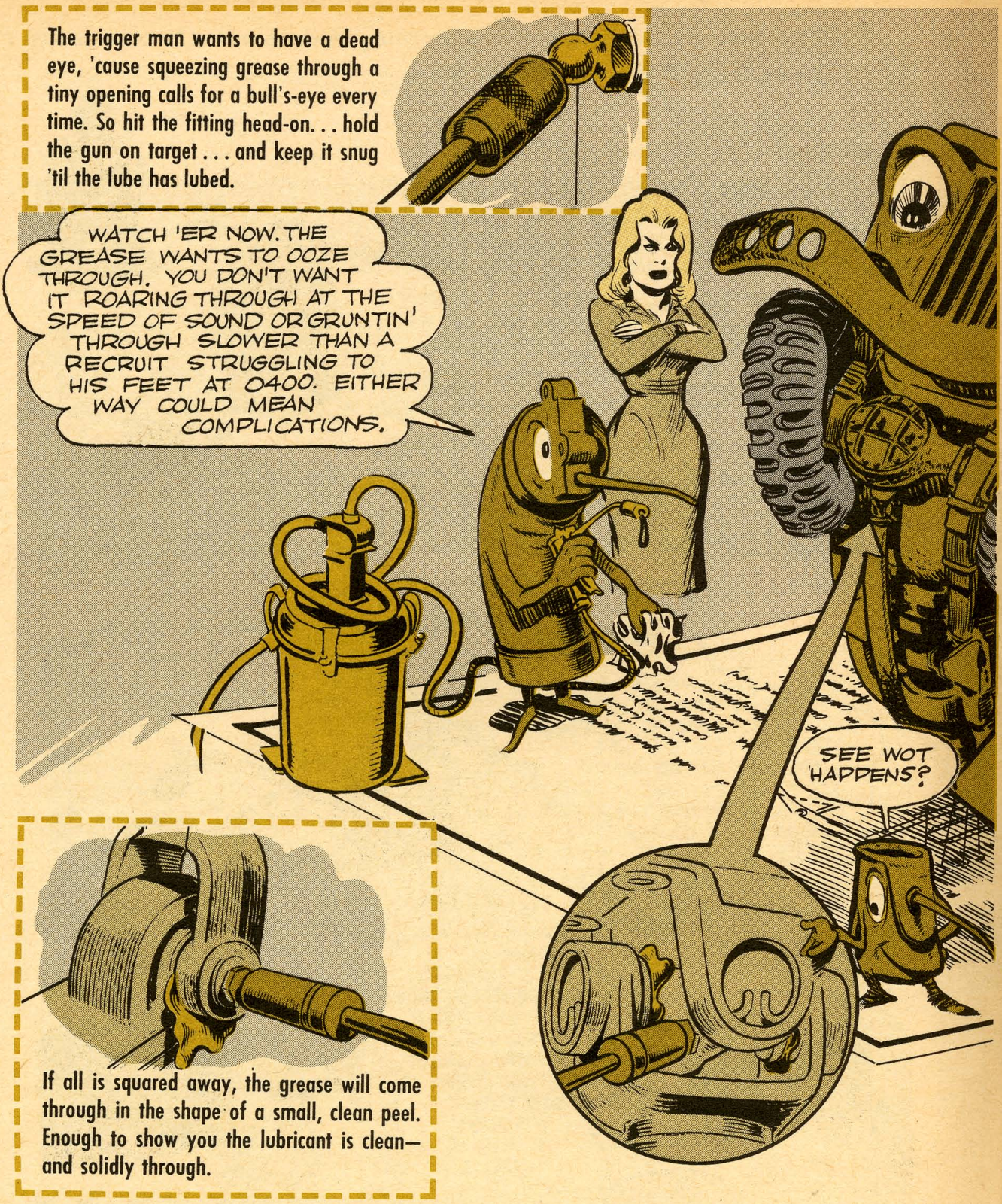




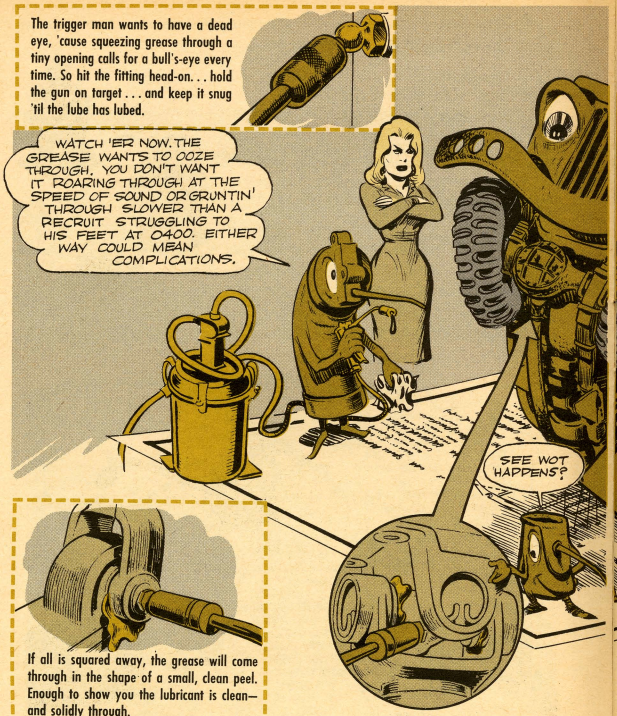




But it won't let the lube get through to the fitting. And that connection twixt coupler and fitting is the payoff of the lube campaign.



Now's the time when that pre-lube nose-cleaning pays off. With the gook cleared from the open end of the lube point, a man can easily spot the fresh stuff coming through. But don't stop shooting until the grease shows clean. Keep shootin' as long as water or dirt-streaked stuff comes out. Push it all out.



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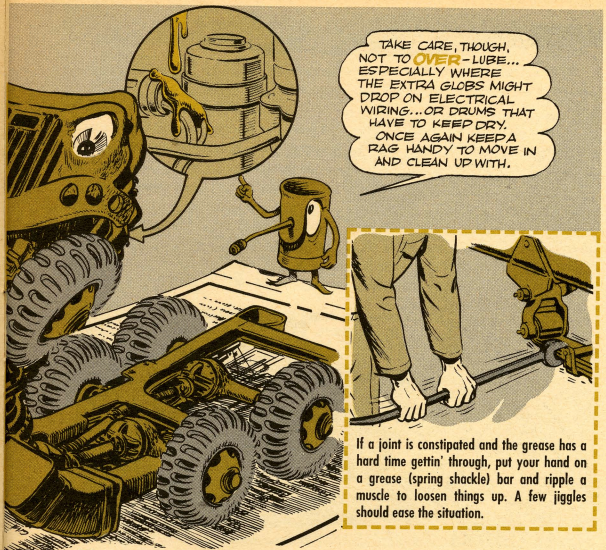
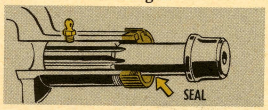
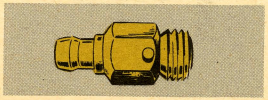


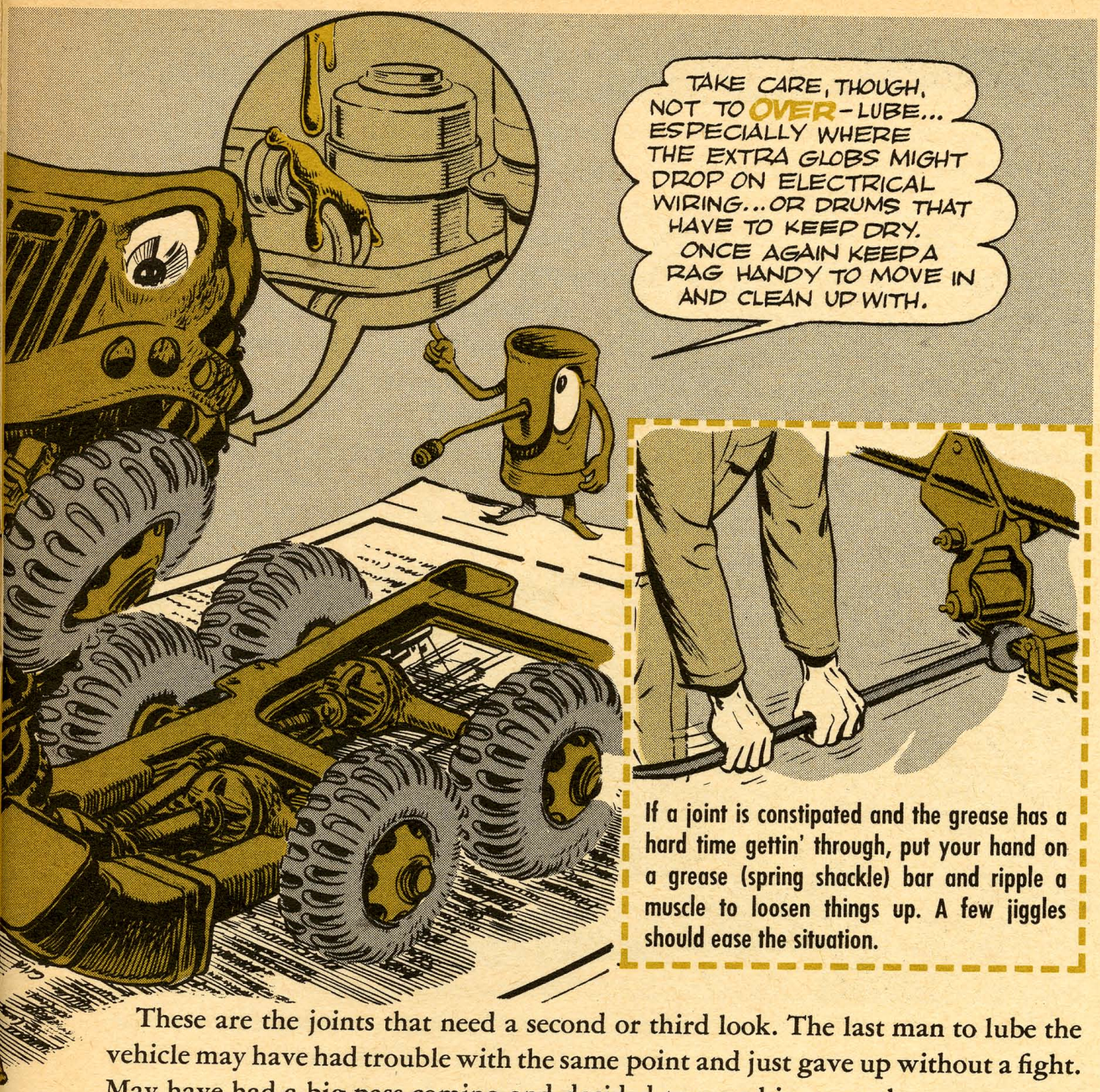
These are the joints that need a second or third look. The last man to lube the vehicle may have had trouble with the same point and just gave up without a fight. May have had a big pass coming and decided to save his strength.

On those universal joints, incidentally, shoot slow and easy. There's a risk of blowing the seals on them. One good shot of grease should be enough. If those units have the pressure-relief type fittings, of course, just watch the relief vent for the sign when to stop shooting.





Might be real good PM to latch on to some of those. They open at a low pressure of 1-5 PSI and go under FSN 4730-330-0111 (ORD).



If a joint is constipated and the grease has a hard time gettin' through, put your hand on a grease (spring shackle) bar and ripple a muscle to loosen things up. A few jiggles should ease the situation.

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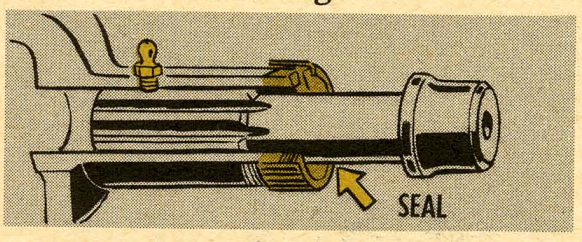
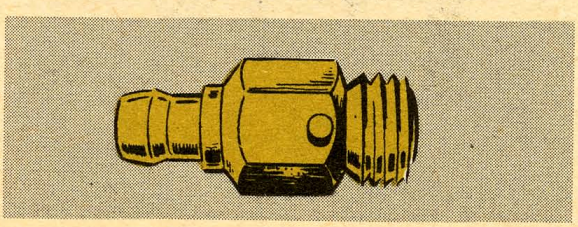
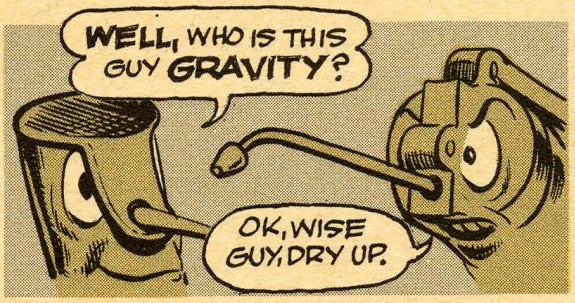




Might be real good PM to latch on to some of those. They open at a low pressure of 1-5 PSI and go under FSN 4730-330-0111 (ORD).

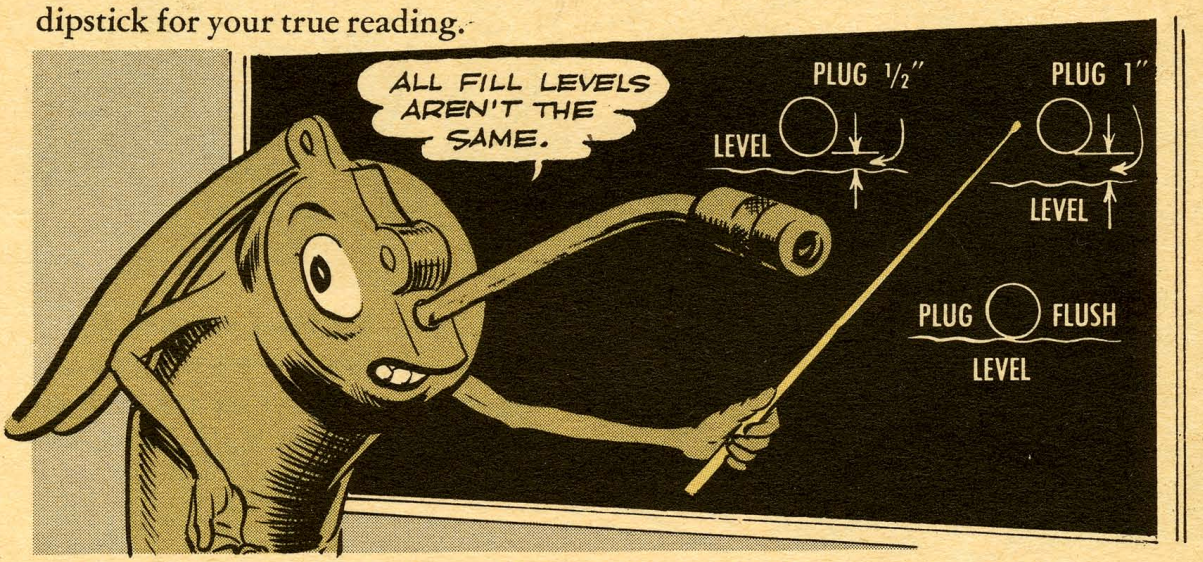
Shooting oil is easier. The only pressure really needed is just enough to beat gravity. Like when you pump oil into a transmission or differential.



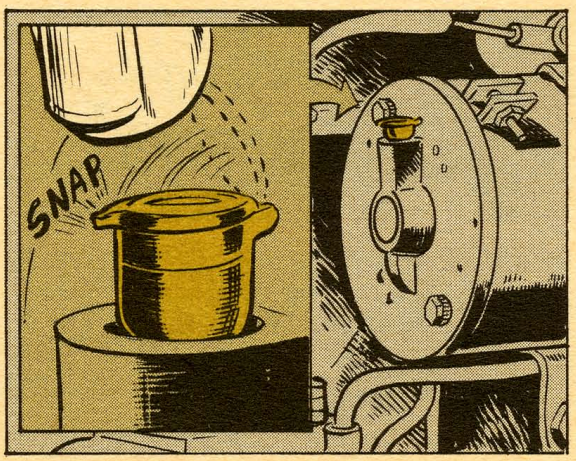
The rule of thumb (or whatever finger you use to check the level) sort of depends on how long ago the vehicle was used. Here's why:

Seems that oil in a churning gear box gets foamed up as the gears go through their motions. So, a reading taken right after the engine is shut down will generally be a false one. That foam gives a higher—and therefore inaccurate—reading.

So wait a little while for that foam to settle. Read a PS or two. Then stick in the dipstick for your true reading.



Now different vehicles have different fill levels. On some, you'll fill the transmission and differential to about one inch below the plug. On others, the level will come to ½ inch below the plug. Still others call for a lube level that's flush with the plug.



Like always, though, check your buggy's LO to make sure you're on the level.

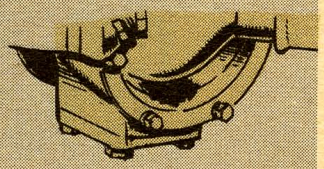
So how's your oil can points? You might cock an eye and ear for the spring-hinge cap that snaps shut on some of the oil cups. Look and listen for the snap of the cap. If the spring is sprung, grit and junk can sift into the oil and grind, grind, grind.

One last word about oil guns, grease guns and their couplers. Never put 'em on the ground. Never put 'em on the ground. Sound monotonous? Never put 'em on the ground.

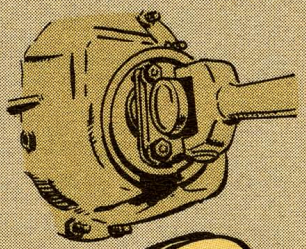
SEALS

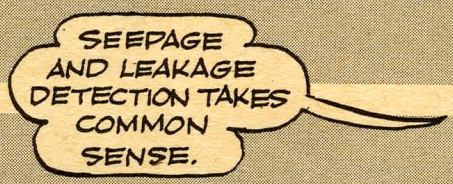
Getting the most out of a seal depends on maybe two things: Having a sharp eye and knowing what to look for. Figuring that every good PM man has two sharp eyes, this is what he'll focus on:

Normal Seepage. Which means the seal is sealing right. It's allowing a tiny amount of oil to ooze through—which serves to lubricate the seal itself and wash away the dirt around the seal.

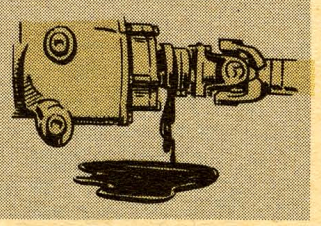


A slight leak. Even if a few solid drops should show, there's no need to yell for help—yet. But keep that sharp eye peeled. And satisfy yourself that those few drops aren't dropping on something that'll suffer damage from lube. F'rinstance: Drippings from a wheel's seal can put the skids on a brake lining. In that case, a new seal is called for, if only to protect the other part.



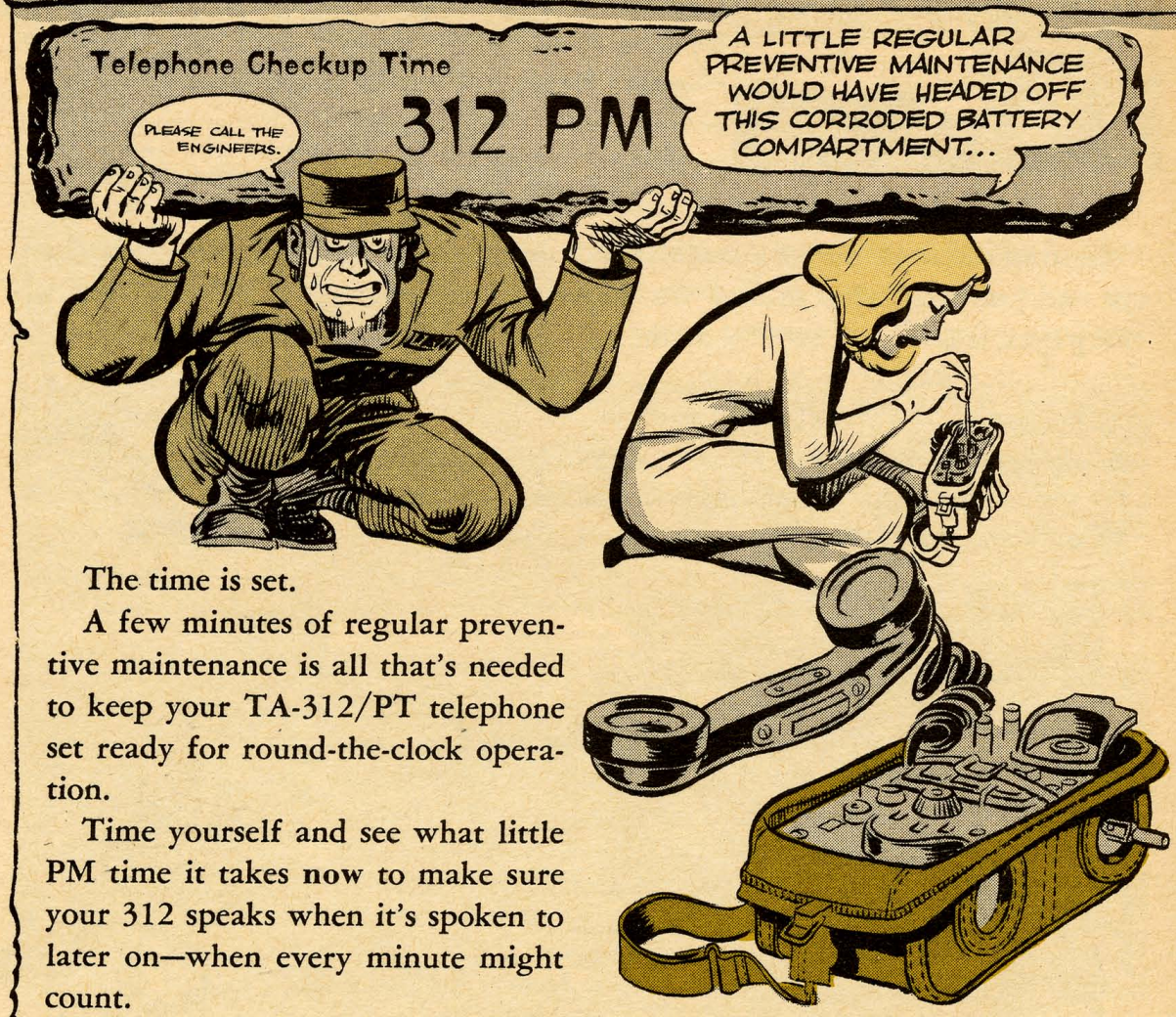


A bad leak. In this case, a unit is losing maybe 20 per cent of its lubricant every thousand miles. The leak is a wet streak that dribbles enough to get a rag wet. Chances are it's time for a change, but don't be anxious to put a buggy on deadline. If a vehicle is really needed, the loss of a few pints of lube might be easier to take than the loss of the vehicle.



For ready reference on lubricants and lubrication in general, no man can go wrong readin' the print in TB ORD 378 and SB 725-9150-1. The most important piece of writin', of course, is the Department of the Army **lubrication order** that comes with every piece of equipment.

That LO is a higher authority than even the TM or manufacturer's LO. The only thing it takes a back seat to (according to AR 310-1) is an Army publication on the equipment dated later than the LO.

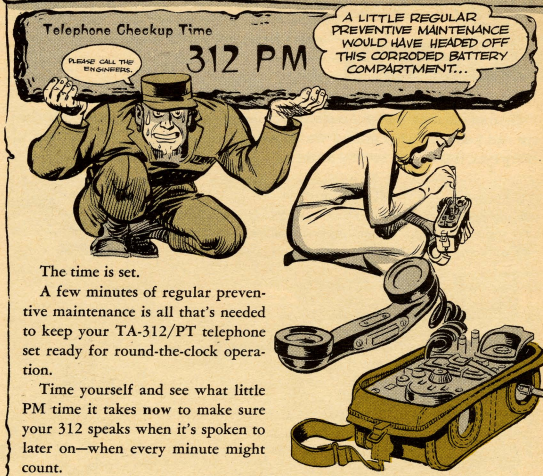


The time is set.

A few minutes of regular preventive maintenance is all that's needed to keep your TA-312/PT telephone set ready for round-the-clock operation.

Time yourself and see what little PM time it takes **now** to make sure your 312 speaks when it's spoken to later on—when every minute might count.

This quick Be-Your-Own-Inspector check list will clue you on the items that usually catch the inspector's eye—and which might break down in the middle of a message from headquarters.



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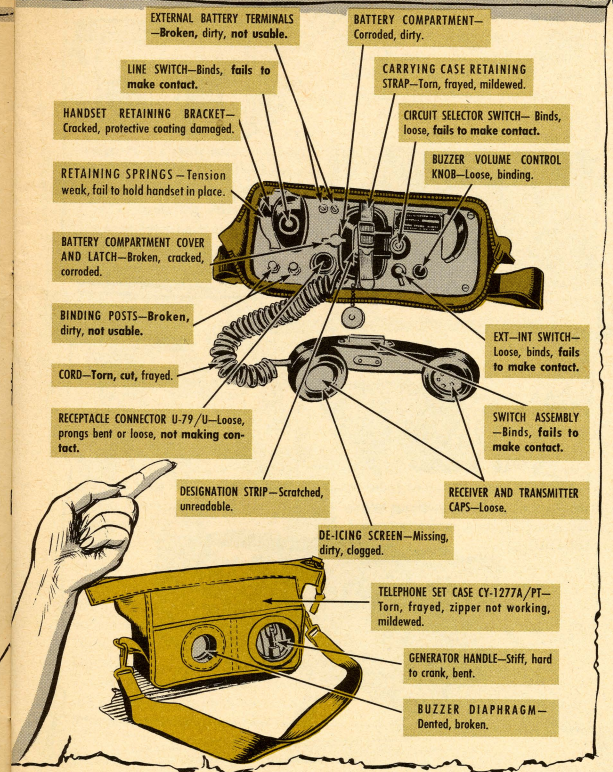
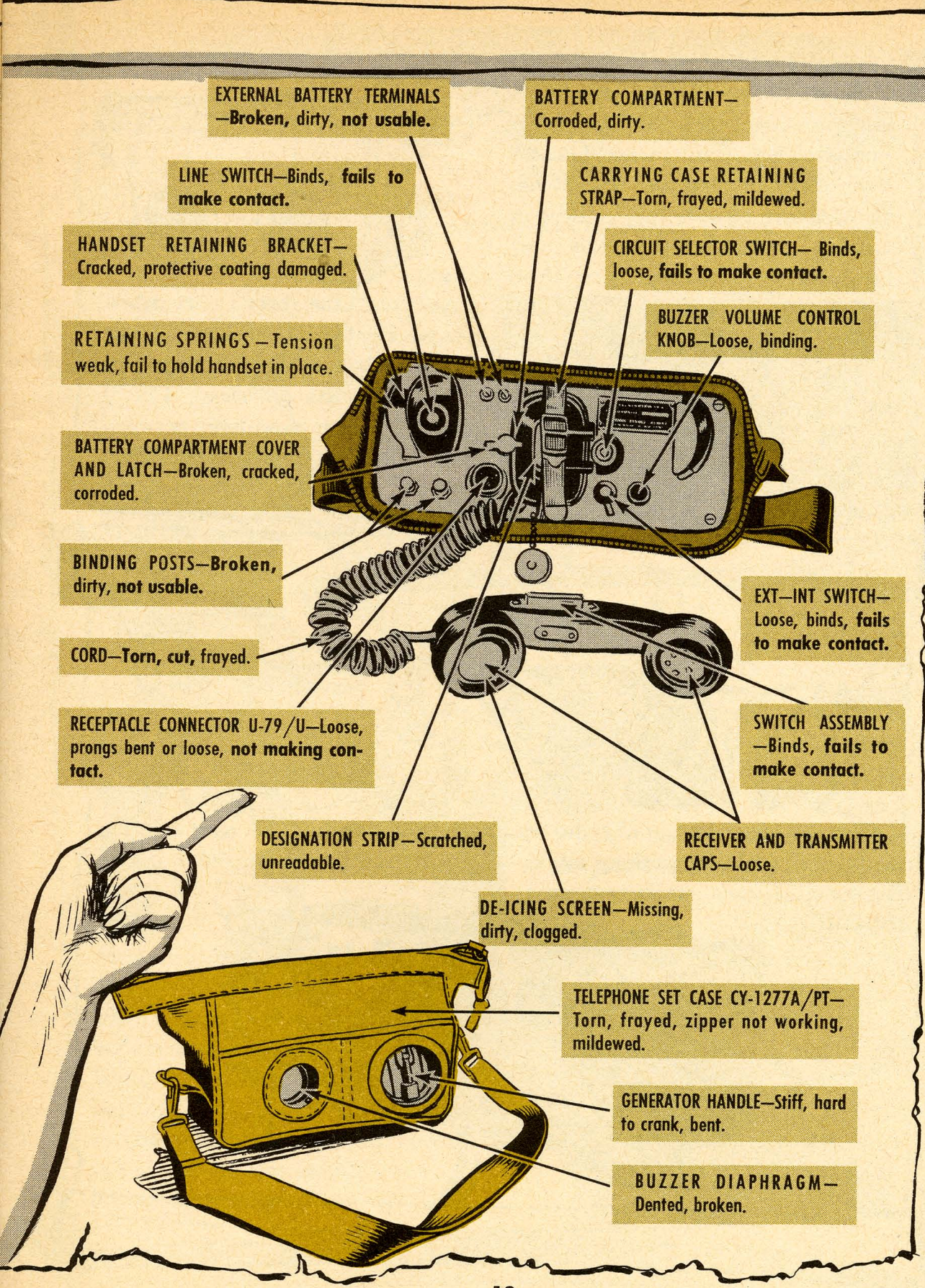
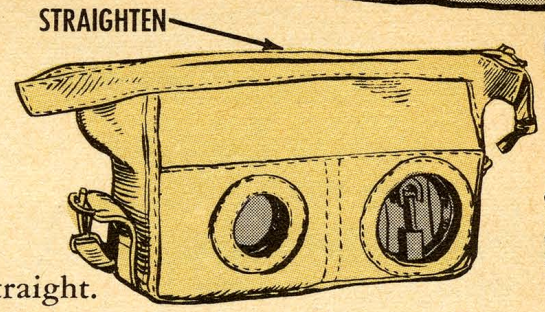
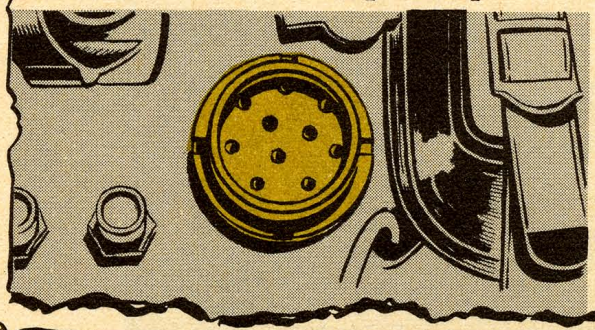



EXTERNAL BATTERY TERMINALS—Broken, dirty, not usable.
BATTERY COMPARTMENT—Corroded, dirty.
LINE SWITCH—Binds, fails to make contact.
CARRYING CASE RETAINING STRAP—Torn, frayed, mildewed.
HANDSET RETAINING BRACKET—Cracked, protective coating damaged.
CIRCUIT SELECTOR SWITCH—Binds, loose, fails to make contact.
BUZZER VOLUME CONTROL KNOB—Loose, binding.
RETAINING SPRINGS—Tension weak, fail to hold handset in place.
BATTERY COMPARTMENT COVER AND LATCH—Broken, cracked, corroded.
BINDING POSTS—Broken, dirty, not usable.
EXT—INT SWITCH—Loose, binds, fails to make contact.
CORD—Torn, cut, frayed.
RECEPTACLE CONNECTOR U-79/U—Loose, prongs bent or loose, not making contact.
SWITCH ASSEMBLY—Binds, fails to make contact.
DESIGNATION STRIP—Scratched, unreadable.
RECEIVER AND TRANSMITTER CAPS—Loose.
DE-ICING SCREEN—Missing, dirty, clogged.
TELEPHONE SET CASE CY-1277A/PT—Torn, frayed, zipper not working, mildewed.
GENERATOR HANDLE—Stiff, hard to crank, bent.
BUZZER DIAPHRAGM—Dented, broken.

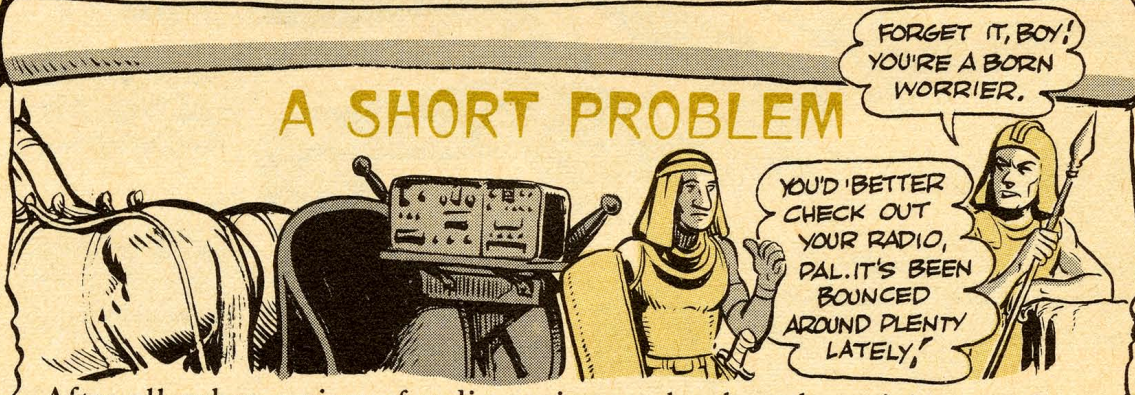
While you're checking, you might put your finger on a couple of other items that bear maintenance. Like the wire stiffeners that are sewed into the carrying case. If they're bent or crooked (which they usually are) bend 'em back into shape. Keep them straight.



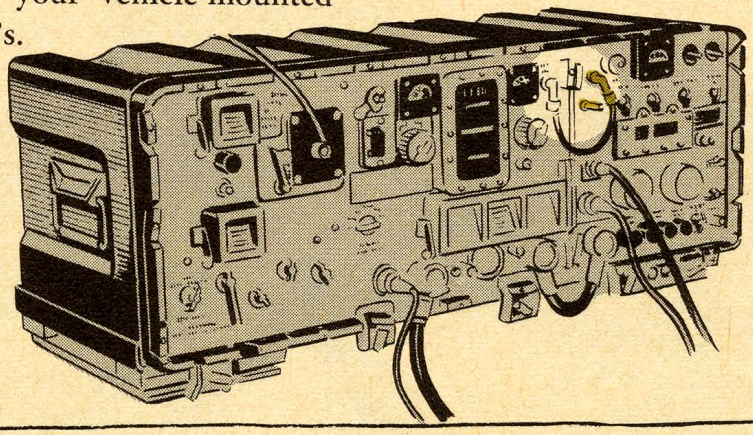


And any time there's a Handset-Headset (H-144/U) attached to your telephone, be sure the plug connector U-79/U contacts are clean. That'll make for a firm handshake between the plug and the connector on the set.

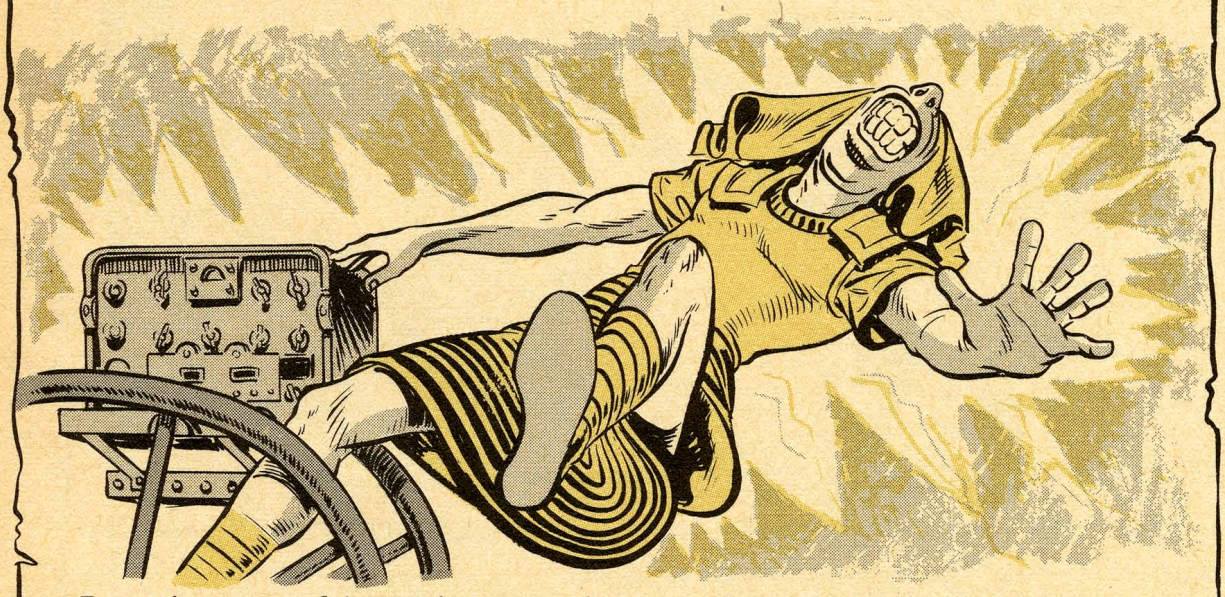
A SHORT PROBLEM



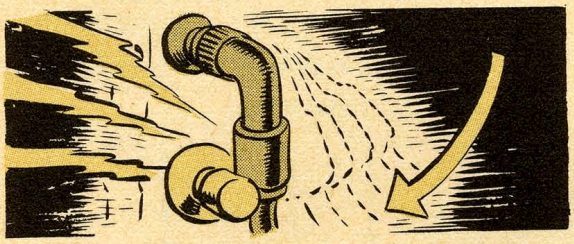
After all, when a piece of radio equipment has been bumpin' over a frozen cornfield all night—something might "give" a little. Really get shook up . . . like some of your vehicle-mounted AN/GRC-19's.



Hour after hour of vibration while your outfit's on the move gives the shakes to the radio frequency cable (CG-1127/U) between the receiver and transmitter. And those vibrations finally lead to a snappy short circuit. Then—Phhhht!

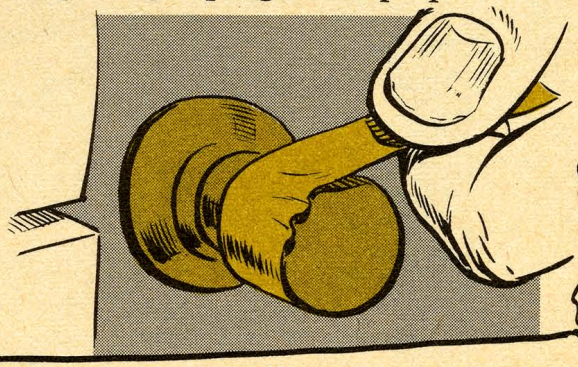


Bouncing around in a Jeep or truck causes the right-angle plug connector to slip clockwise until it bumps against the antenna binding post (E101) on the receiver. It doesn't have to turn far, either.



A little tape will take the sting out of the problem, though, and remove the risk of any short-circuiting.

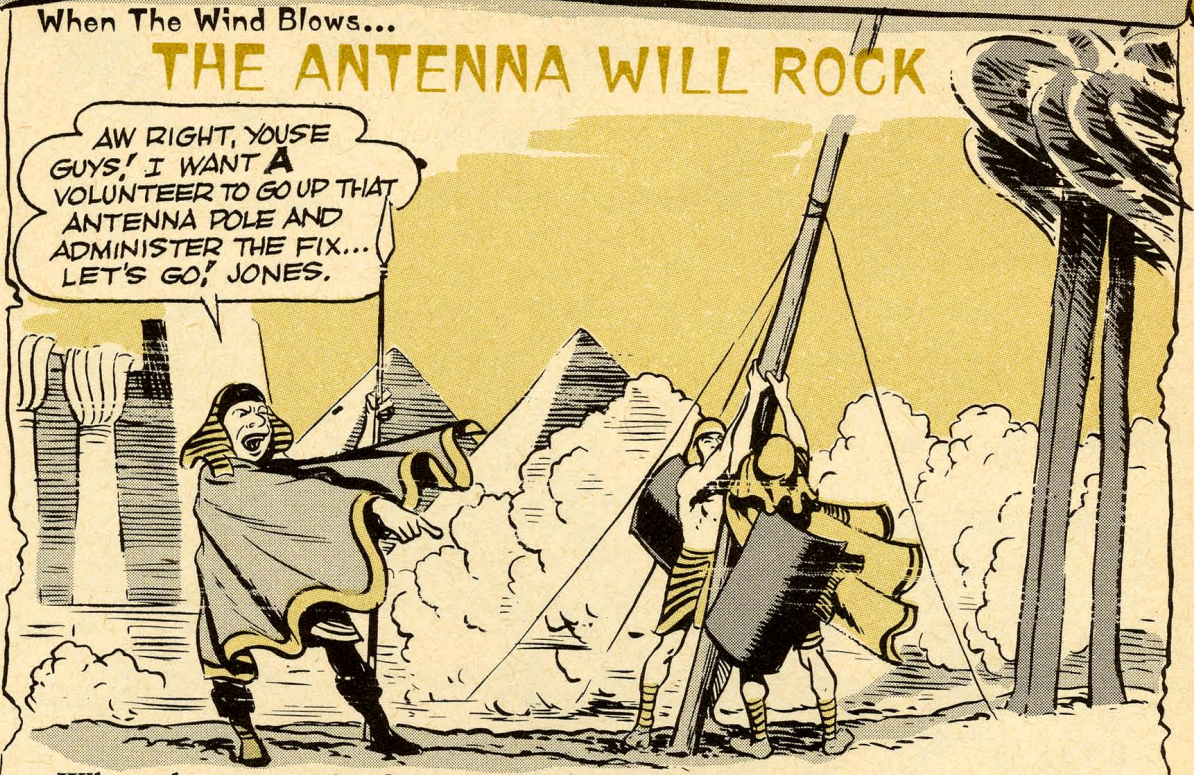
Three or four wrappings of electrical insulation tape (TL-636/U) will wrap things up right and proper. The number of that tape is FSN 5970-296-1175. Just cut a strip about ¼-in wide and make with the wrappings. Wind it around the end of the binding post.



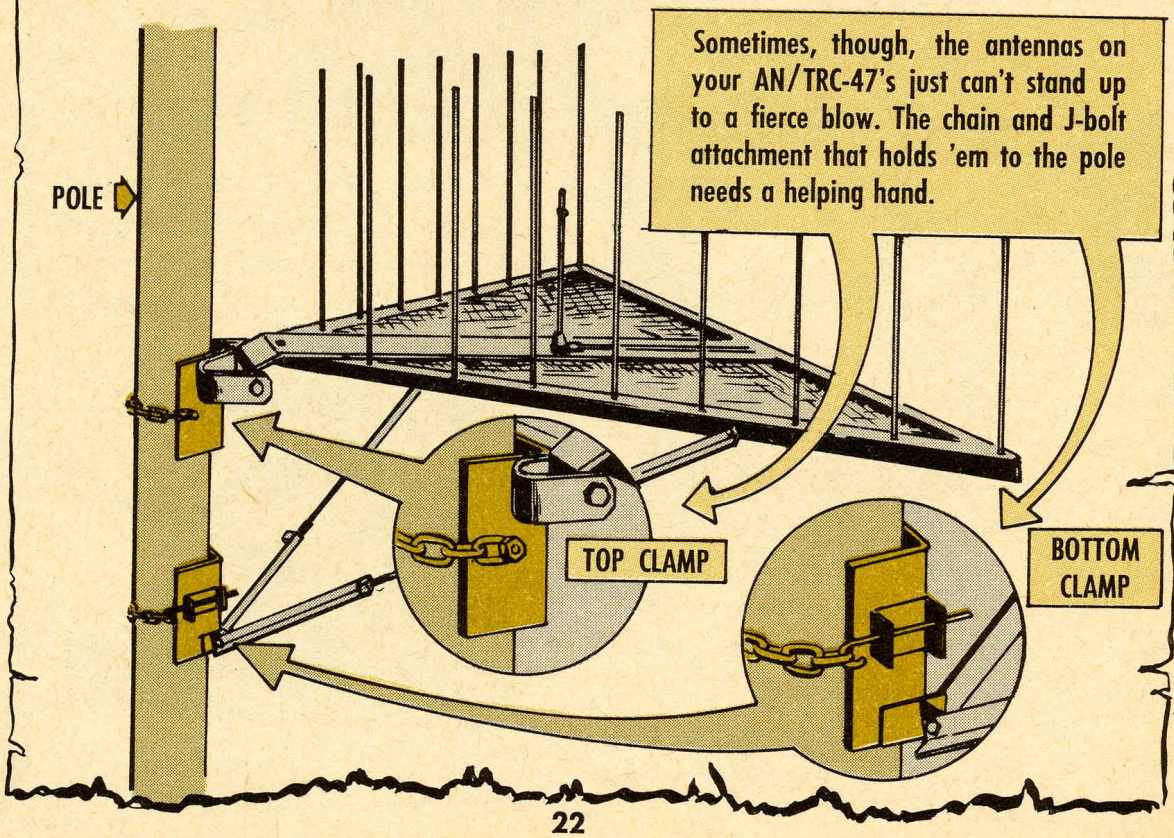
That will insulate the post enough so's to prevent any trouble when and if the plug connector bumps against it.

When The Wind Blows...

THE ANTENNA WILL ROCK

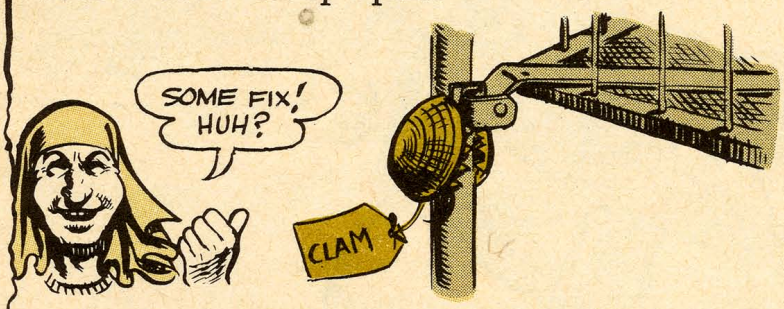


When the storm clouds gather and the wind starts screamin', it's time to latch on to your antennas and really hang on.



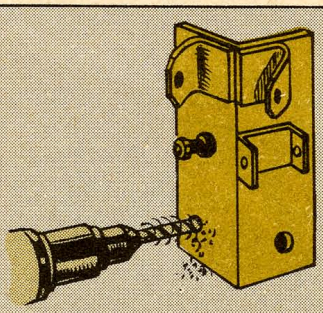
So-o-o-o, to keep your AS-813/TRC-47 antenna from lyin' down on the job when you might need your command and local nets the most, try checking this policy for wind insurance.

Just about all you'll need to clamp things down is a good drill, half a dozen 3-in lag screws, the right wrench and a man who can handle that hardware about 15 or 20 feet up a pole.

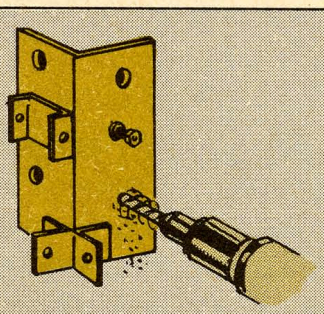


The idea is to fasten the upper and lower pole clamps to the pole tighter'n the shells of an old clam with lockjaw.

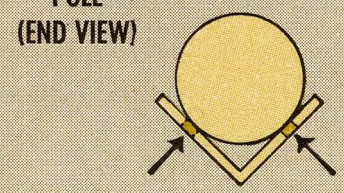
If you're satisfied with the location of your antenna right now, just tighten 'er up where she stands. Make sure the chains and J-bolt are tight.



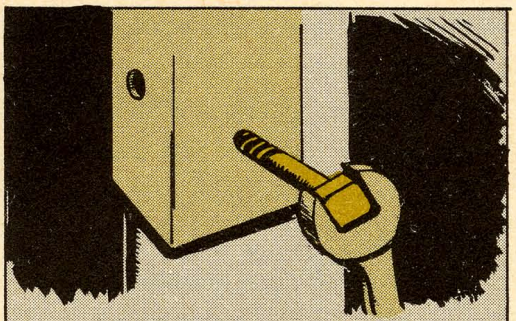
Then drill two holes through the upper clamp—one on each side.



And drill four holes through the lower clamp—two on each side.



Try to drill those holes at spots where the clamps are flush against the pole.



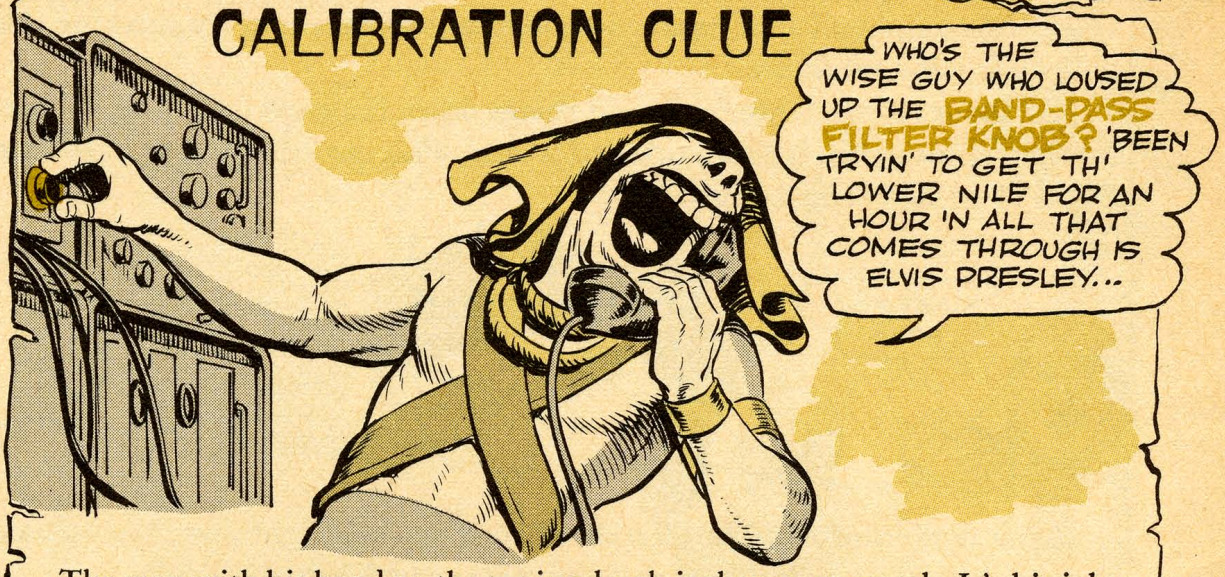
Then drive home the 3-in lag screws—and let the wind blow.

'Cause after that all you have to worry about is the pole itself.

When things get that windy, everybody better head for the cave!

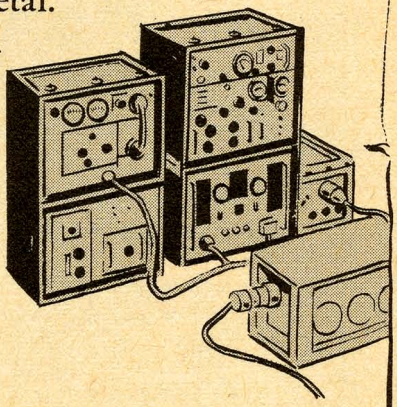
Case Of The AN/TRC-24

CALIBRATION CLUE



The man with his hand on the tuning knob is the one to watch. It's his job to put the set on frequency . . . keep it that way . . . and make quick changes when the word is passed.

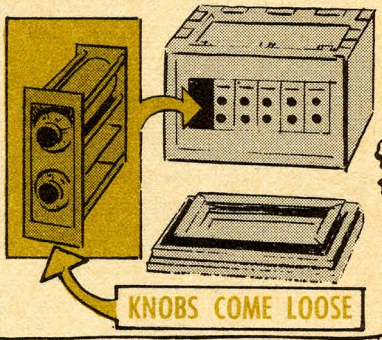
But a simple thing like a loose knob on a shaft can clobber his calibration and make the whole set a useless pile of tubes and metal.



That's been the story on some AN/TRC-24's. The band-pass filters on both the receivers and transmitters have been coming down with loose knobs.

They get that way when an operator makes with a turn, all the way to the extreme counterclockwise position. The knob bumps against the stop—and the temptation then is to force it a little to get that extra shade of a turn.

Real risky. Because the nut that holds the tuning knob on its shaft is not torqued to stand pressure. It'll hold the knob on the shaft nice and snug, and that's all.

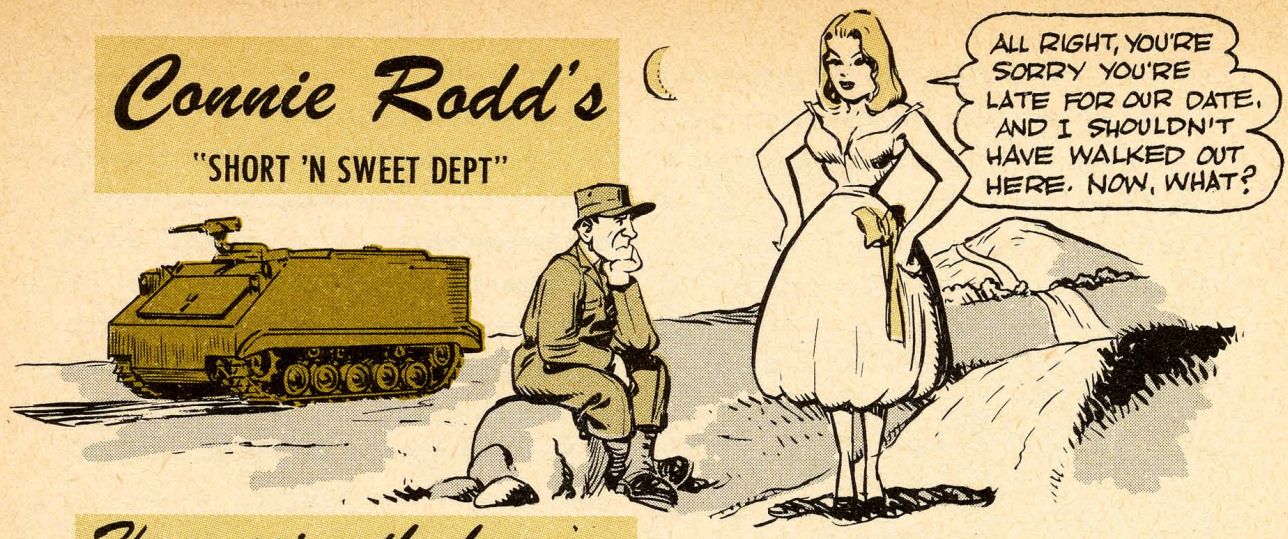


Forcing the knob against the stop position will loosen the knob—damage both shaft and nut—confuse your calibration and finally foul the filter.

So calibrate carefully—and stop at the end of the line.

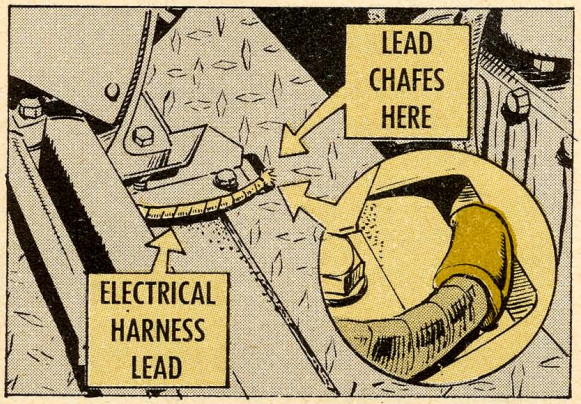
Connie Rodd's

"SHORT 'N SWEET DEPT"



Harnessing the harness

Here's one for you crewmen of the M59 APC and the 4.2 self-propelled mortar M84 . . . it's been found that the electrical harness lead to the fuel pump gets chafed where it runs through the cut out of the front access panel (to the



right of the driver's seat). This chafing'll eventually cause the fuel pump wiring harness to short out.

So to keep on the safe side take a few minutes and look at it.

If the harness does show signs of wear and tear, tape the frayed cables and install a rubber insulator sleeve over the harness where it comes out of the panel. You can make a workable insulator sleeve from some scrap rubber or plastic hose.

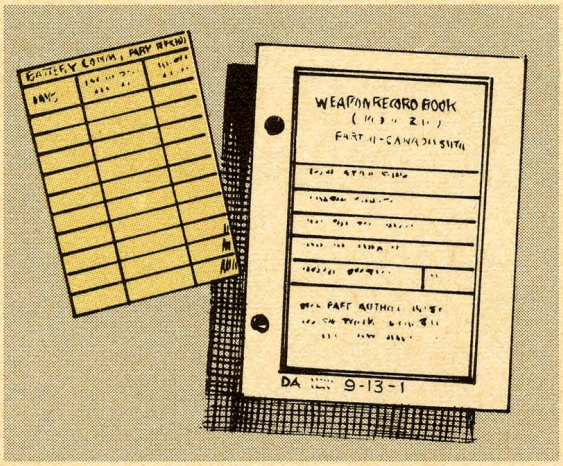
And if it doesn't show any damage (you might have a vehicle with little mileage on it), do it anyway. It could save you the big job later on or being stuck in the boondocks while everybody else is showered and shaved and through the gate.

Little brown book

You can't always judge a book by its cover, and that's really true about your Gun Book (DA Form 9-13 and 9-13-1 or Weapon Record Book). They all look pretty much the same on the outside, but the info on the inside is what counts.

That little book gives the life history of your weapon. It tells whether it performed up to par or not, and just how much it could take before it went the way of wornout weapons.

There's one thing to keep in mind when you're putting that info in your little brown book—fast firing and various ammo can make a difference in the wear rate of your weapon. So that's why it's important to give all the dope.



Some of the things that help to make your Gun Book a complete history are—type of round, number of rounds, and date fired. To get an idea of how these are recorded, turn to page 2 of Part II of your Gun Book . . . it spells it out right well.

Turret traversing blues

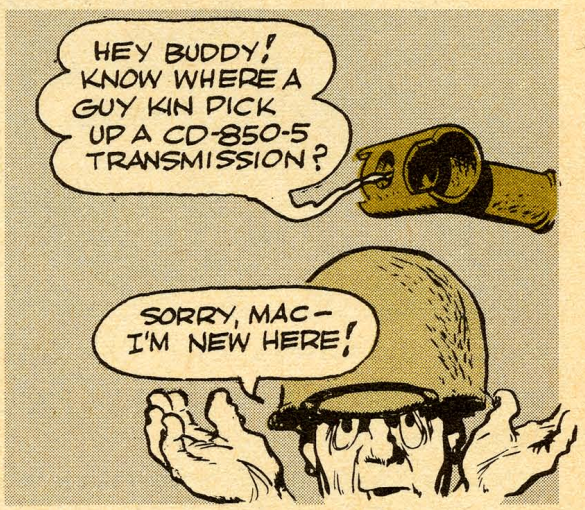
A place for everything and everything in its place... that's the secret of smooth operation of tank turrets. But it seems some crewmen have been getting careless and let the chips fall where they may. Like spent rounds.

A spent round sticking out past the basket rim, for example, can easily smash the ammo tube stowage racks and the rear heater mount support assemblies when you traverse the turret. Not to mention the shell return plate, the blower and support on the air cleaner assembly and the heater exhaust outlet elbow.

Same thing applies on the outside, too. A heap of damage can be done by not stowing gear where it belongs. When the turret turns . . . c-r-u-n-c-h!

You'll save yourself a lot of trouble by taking a fast look-see around before you roll the merry-go-round.

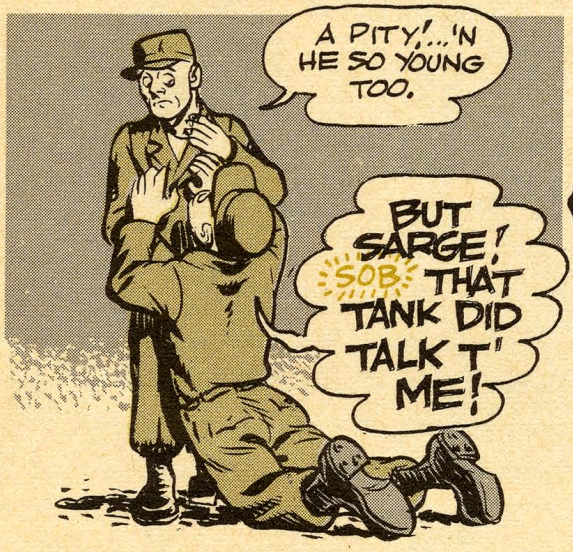
Transmission tale



Listen up... if you happen to be using any of these tracked vehicles: M46, M46A1, M47, M48 or M48A1 medium tanks, M53 or M55 self-propelled weapons, or LVT 5 or LVT A-6 amphibs.

You can latch onto the latest thing in the CD 850-series next time you run

into transmission trouble. CD 850-5 is the latest deal in this cross-drive transmission series...and it's on hand to replace all the older models in the same series. In fact, all the earlier models in the CD 850-series are being rebuilt—whenever they're turned in—so they'll measure up to the CD 850-5 specs.



This transmission's already sitting in the tail-end of your new M48A2 medium tank.

In case anybody's interested, the asking number for the CD 850-5 is...FSN 2520-333-3522.

No wondering now

Been wondering how you're going to recharge your M15 compressed air breathing apparatus? Relax. The new M3 compressed air adapter-detector is

ready and waiting for you now. You recharge your M15 by hooking it up to the M3, which in turn is hooked up to the capping compressor at your missile site. FSN 4240-602-8109 gets you the adapter.

Splash! Flash!

Speed can kill you—even when your vehicle's standing still! Learn it the hard way and you won't be around to tell the tale. One little spark and it could be splash—flash—b-o-o-m!

Naturally, all this yappin's about controlling the rates at which you refuel your vehicle gas tanks. The latest dope

on this maximum safe refueling business is covered in TB Ord 2300-10/1 (2 Apr 58). Being it's numbered according to the new TB numbering system, you might find it hard to recognize it as the new version of TB Ord 692 (14 Aug 57). The difference between the two TB's is that the new one covers more vehicles.

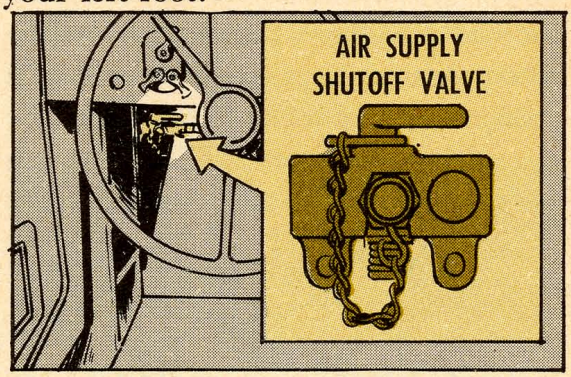
Might surprise you to learn there's a big spread in rates of refueling from vehicle to vehicle. F'rinstance, the older M38 Jeep only sips gas at 13 GPM, while the later M38A1 Jeep has a gas tank filler neck that guzzles liquid at 20 GPM.

The bigger the tank and the better the air venting, the faster she'll guzzle gas without forming air pockets that'll spit gas back in your direction. Gas on the loose gets around faster'n an alley cat—and the fumes scatter faster'n a covey of flushed quail. Under those conditions, the glow from a distant cigarette butt could be enough to set off your last big boom.

So, play it safe, like the TB says, and stencil the refueling rate on your vehicle in letters that reach at least 1½ inches high . . . pronto.

Cap kicks?

You herdin' a G742- or 749-series 2½-ton truck? With the air supply shutoff valve on the firewall? Just above your left foot?



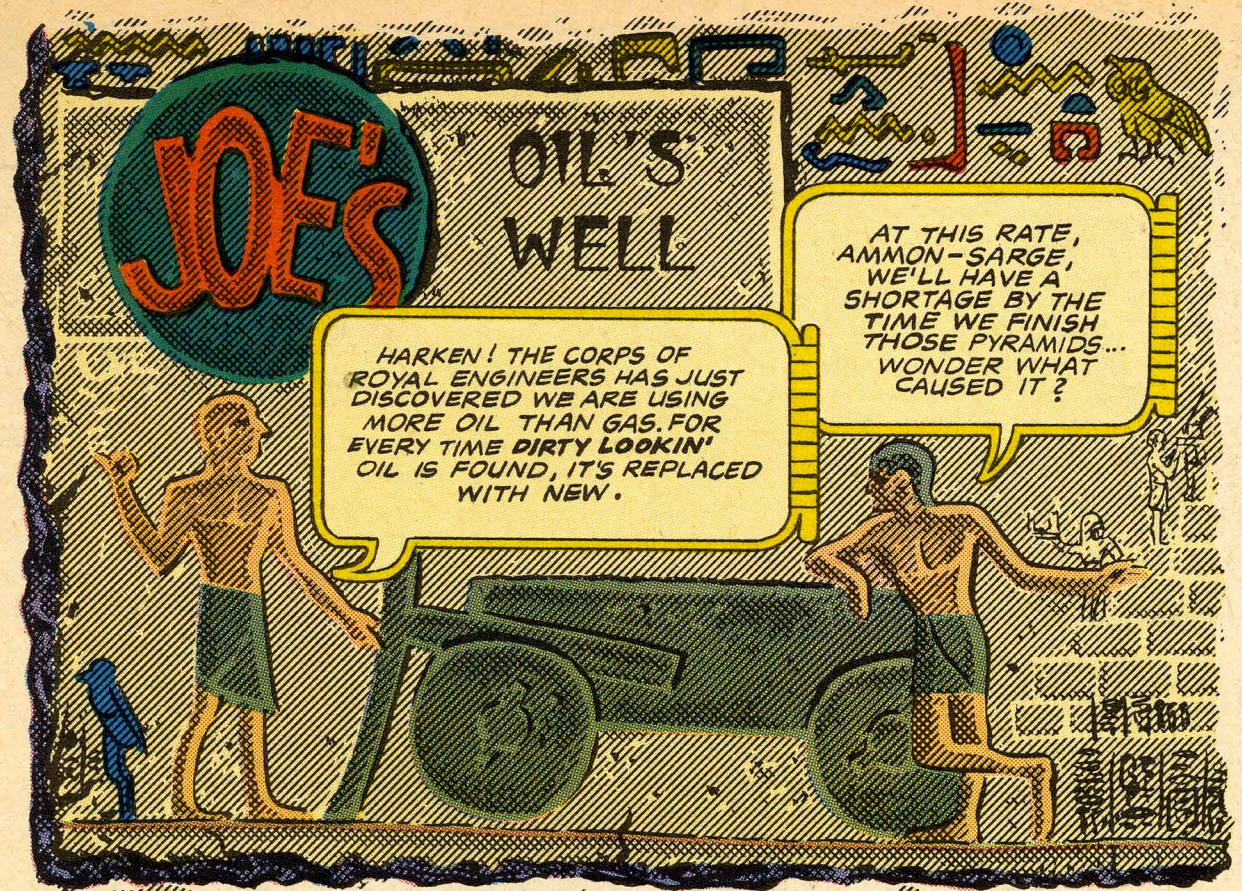
Then keep that clod-knocker on the floorboard . . . and don't go using that valve assembly as a foot rest. You're likely to kick the dust cap loose—and maybe snap off the chain—and lose 'em both.

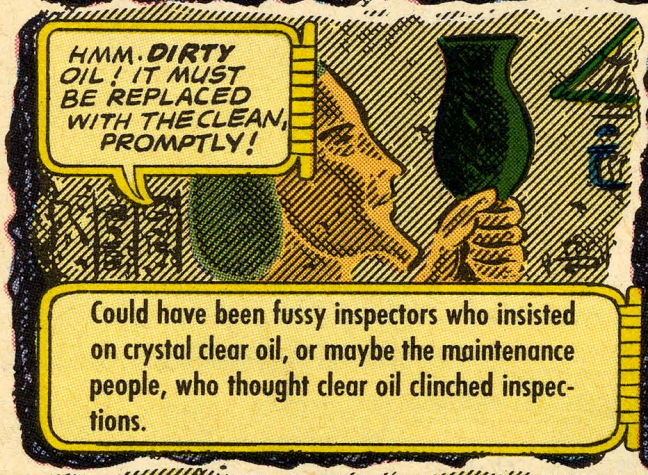
Good idea to check that cap now and then, just to make sure it's screwed on tight and doing its job. It won't keep dust out of the valve if it's loose and dangling on its chain.

Also, before screwing a cap on—always remember to open the valve a bit to blow out any muck that may have collected in the valve, or cap. Let a little sand work its way into that valve . . . and soon it's shot.

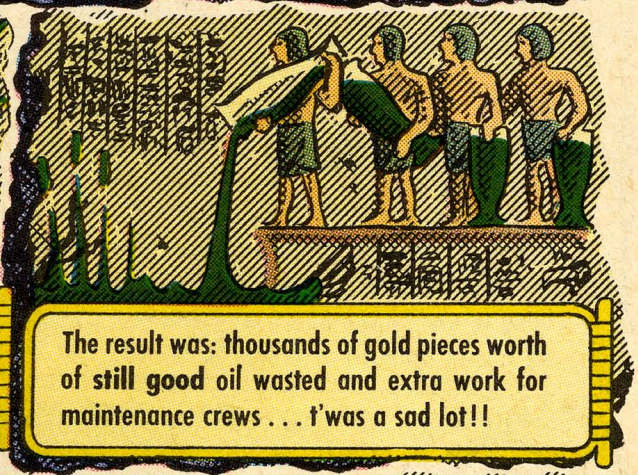
Should you ever lose a cap (and chain) don't go trying to get 'em from supply. They're not carried as separate items—and can be had only with a complete valve assembly. And that costs $$$.

Best thing to do is to check with your support unit and see about getting the caps made up locally. They're pretty simple to fabricate.

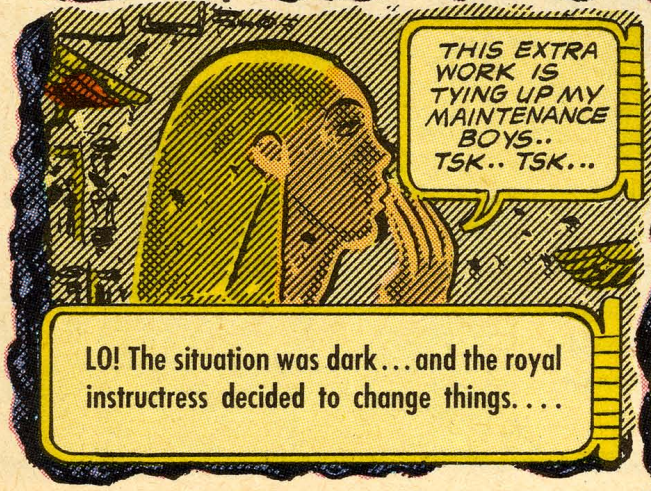




Could have been fussy inspectors who insisted on crystal clear oil, or maybe the maintenance people, who thought clear oil clinched inspections.

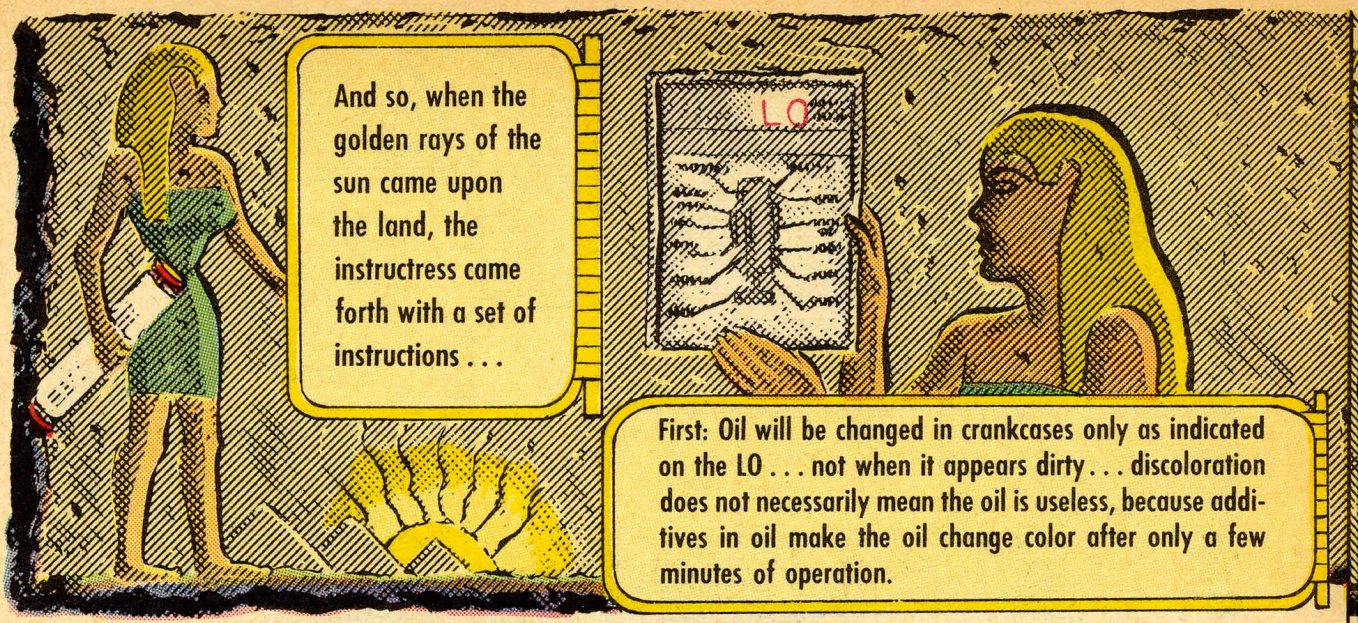


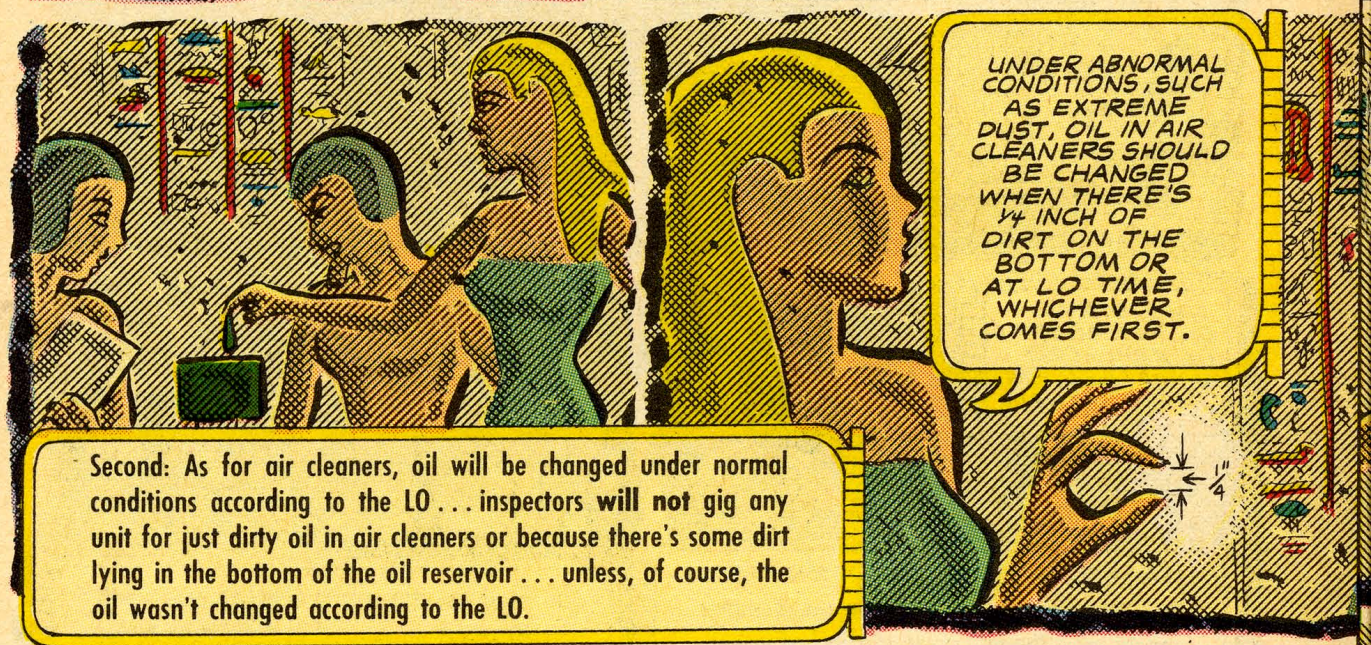
The result was: thousands of gold pieces worth of **still good** oil wasted and extra work for maintenance crews . . . t'was a sad lot!!

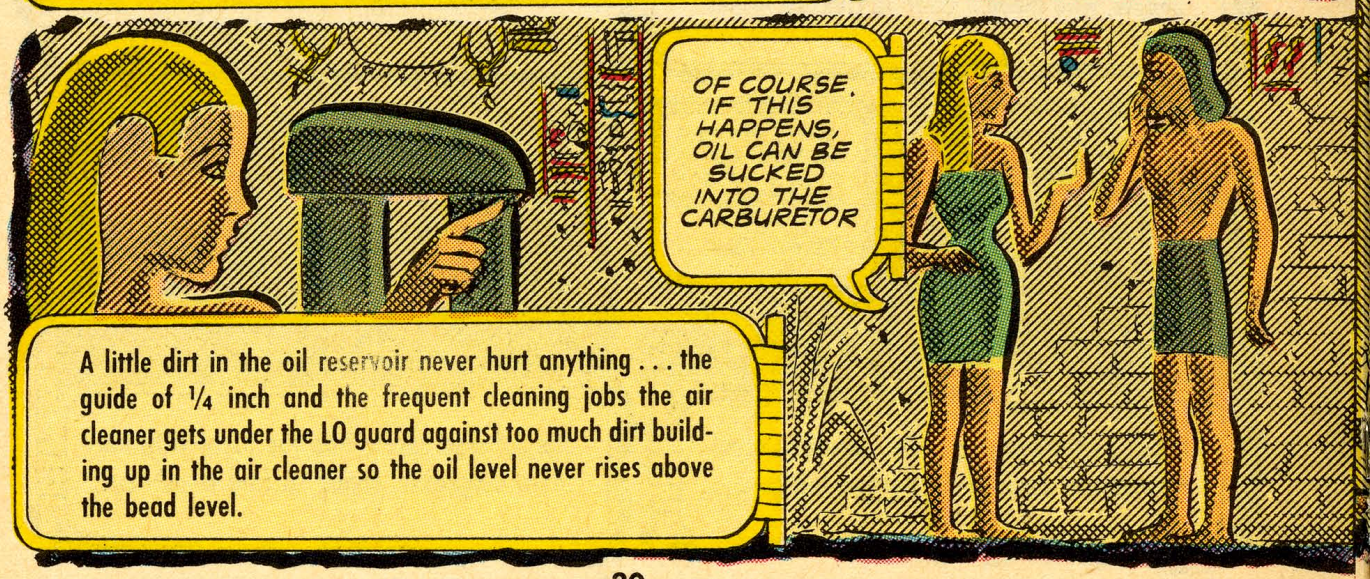


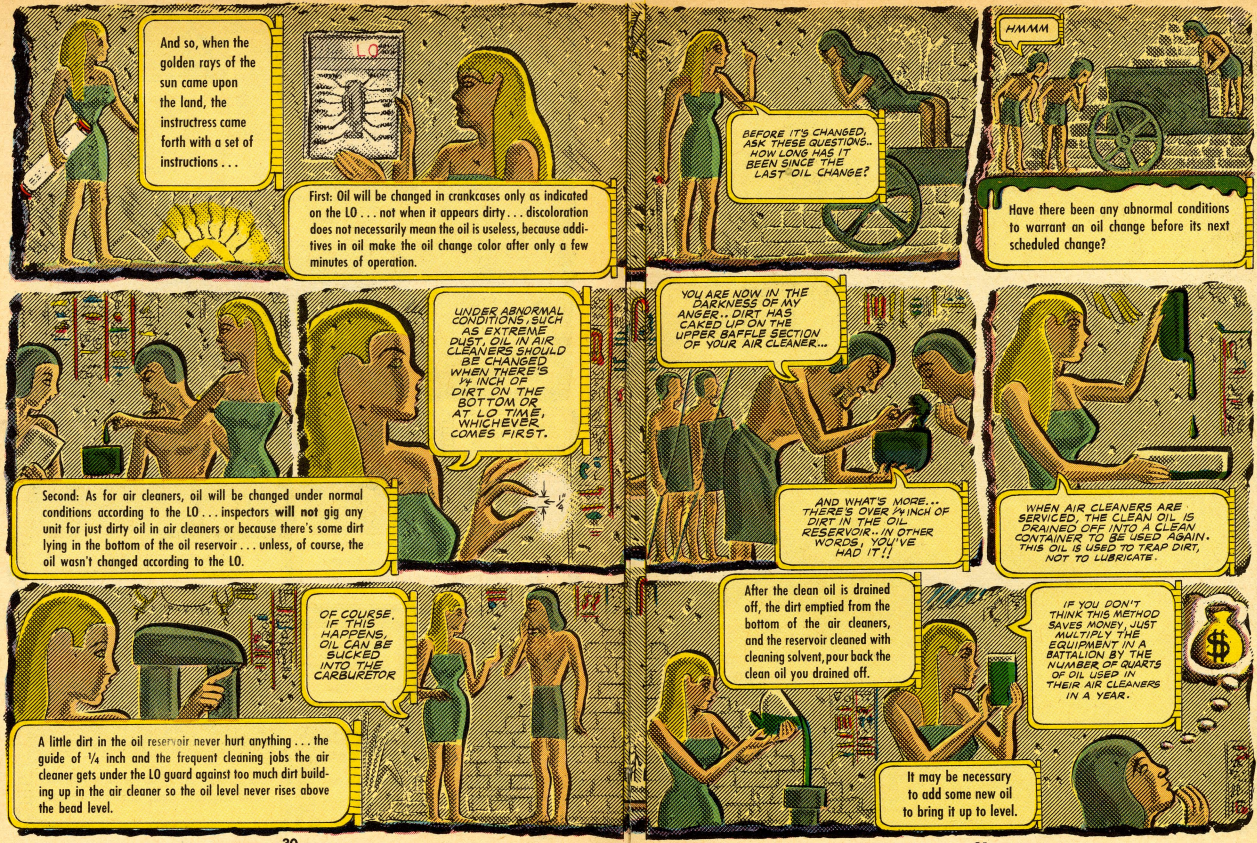
LO! The situation was dark . . . and the royal instructress decided to change things. . . .

She labored sorely into the night with her royal sergeants, trying to find a solution.


And so, when the golden rays of the sun came upon the land, the instructress came forth with a set of instructions . . .
LO
First: Oil will be changed in crankcases only as indicated on the LO . . . not when it appears dirty . . . discoloration does not necessarily mean the oil is useless, because additives in oil make the oil change color after only a few minutes of operation.


UNDER ABNORMAL CONDITIONS, SUCH AS EXTREME DUST, OIL IN AIR CLEANERS SHOULD BE CHANGED WHEN THERE'S ¼ INCH OF DIRT ON THE BOTTOM OR AT LO TIME, WHICHEVER COMES FIRST.
1" ¼
Second: As for air cleaners, oil will be changed under normal conditions according to the LO . . . inspectors **will not** gig any unit for just dirty oil in air cleaners or because there's some dirt lying in the bottom of the oil reservoir . . . unless, of course, the oil wasn't changed according to the LO.


OF COURSE. IF THIS HAPPENS, OIL CAN BE SUCKED INTO THE CARBURETOR
A little dirt in the oil reservoir never hurt anything . . . the guide of ¼ inch and the frequent cleaning jobs the air cleaner gets under the LO guard against too much dirt building up in the air cleaner so the oil level never rises above the bead level.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BEFORE IT'S CHANGED, ASK THESE QUESTIONS.. HOW LONG HAS IT BEEN SINCE THE LAST OIL CHANGE?
HMMM
Have there been any abnormal conditions to warrant an oil change before its next scheduled change?
UNDER ABNORMAL CONDITIONS, SUCH AS EXTREME DUST, OIL IN AIR CLEANERS SHOULD BE CHANGED WHEN THERE'S ¼ INCH OF DIRT ON THE BOTTOM OR AT LO TIME, WHICHEVER COMES FIRST.
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YOU ARE NOW IN THE DARKNESS OF MY ANGER.. DIRT HAS CAKED UP ON THE UPPER BAFFLE SECTION OF YOUR AIR CLEANER...
AND WHAT'S MORE... THERE'S OVER ¼ INCH OF DIRT IN THE OIL RESERVOIR.. IN OTHER WORDS, YOU'VE HAD IT!!
WHEN AIR CLEANERS ARE SERVICED, THE CLEAN OIL IS DRAINED OFF INTO A CLEAN CONTAINER TO BE USED AGAIN. THIS OIL IS USED TO TRAP DIRT, NOT TO LUBRICATE.
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A little dirt in the oil reservoir never hurt anything . . . the guide of ¼ inch and the frequent cleaning jobs the air cleaner gets under the LO guard against too much dirt building up in the air cleaner so the oil level never rises above the bead level.
After the clean oil is drained off, the dirt emptied from the bottom of the air cleaners, and the reservoir cleaned with cleaning solvent, pour back the clean oil you drained off.
IF YOU DON'T THINK THIS METHOD SAVES MONEY, JUST MULTIPLY THE EQUIPMENT IN A BATTALION BY THE NUMBER OF QUARTS OF OIL USED IN THEIR AIR CLEANERS IN A YEAR.
$
It may be necessary to add some new oil to bring it up to level.

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Joe's Dope Sheet
WE HAVE THE WORLD'S BEST EQU

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Or, like this ancient
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While times have changed,
The truth has not—
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You still will have
To change and check
Or find yourself
Afoot—with wreck.
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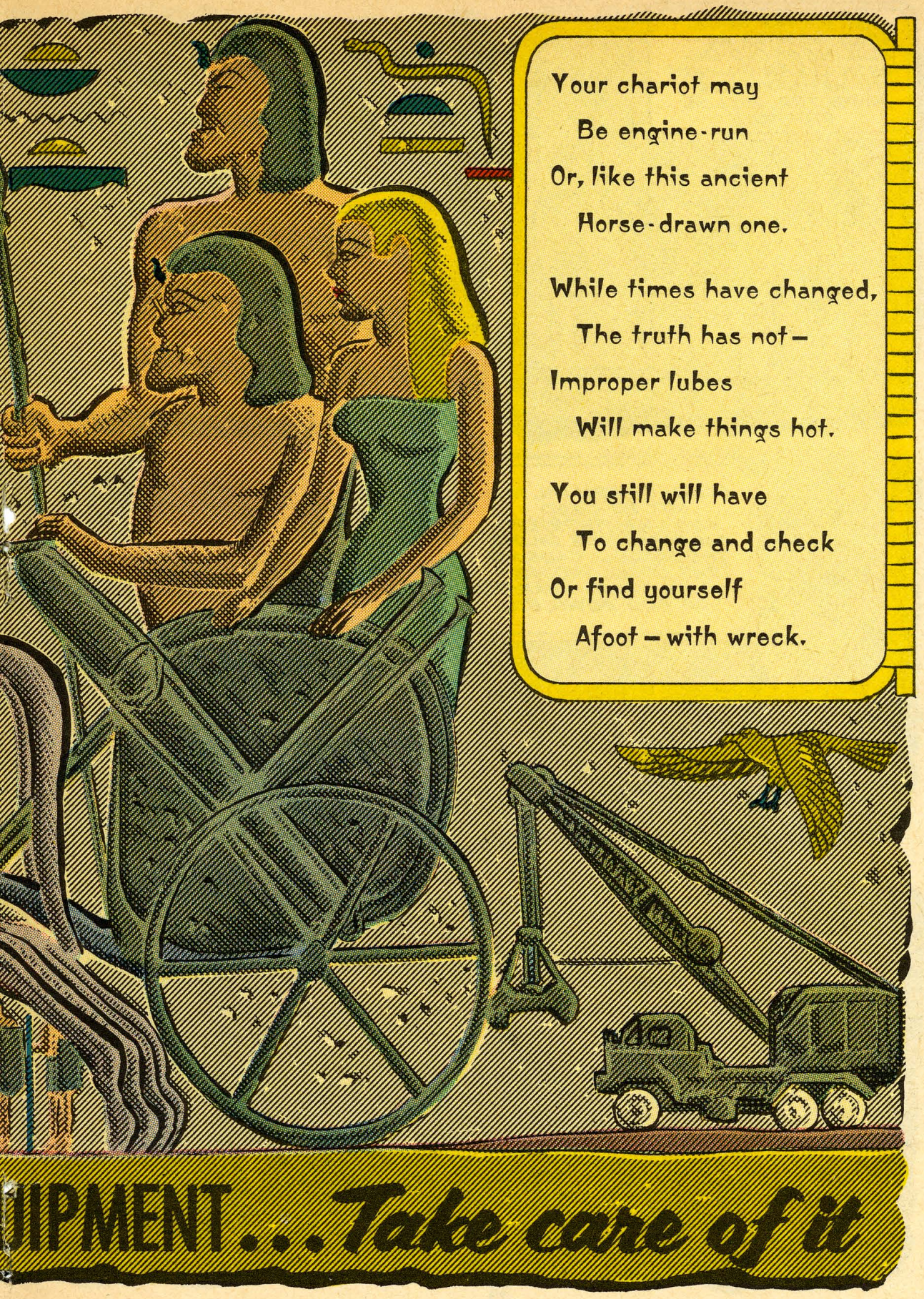
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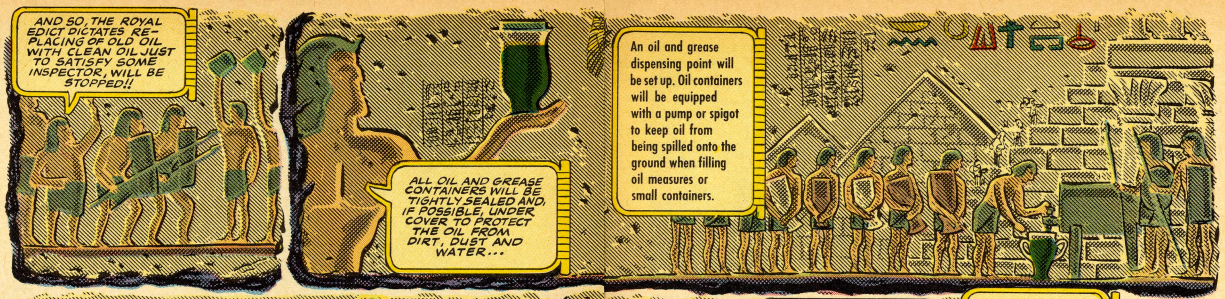
AND SO, THE ROYAL EDICT DICTATES REPLACING OF OLD OIL WITH CLEAN OIL JUST TO SATISFY SOME INSPECTOR, WILL BE STOPPED!!
ALL OIL AND GREASE CONTAINERS WILL BE TIGHTLY SEALED AND, IF POSSIBLE, UNDER COVER TO PROTECT THE OIL FROM DIRT, DUST AND WATER...
CLEAN OR NEW OIL WILL NOT BE USED FOR UNAUTHORIZED PURPOSES LIKE OILING THE SANDS... CAUSING THE ROYAL TROOPS TO STUMBLE.. CHARIOTS TO BOG DOWN, ETC.
THIS HAS CUT DOWN ON THE USE OF OILS SO MUCH THAT WE FIGURE INSTEAD OF WASTING ALL THAT GOLD, WE ARE NOW SAVING IT. AND MY MAINTENANCE CREWS CAN HAVE TIME FOR OTHER LABORS.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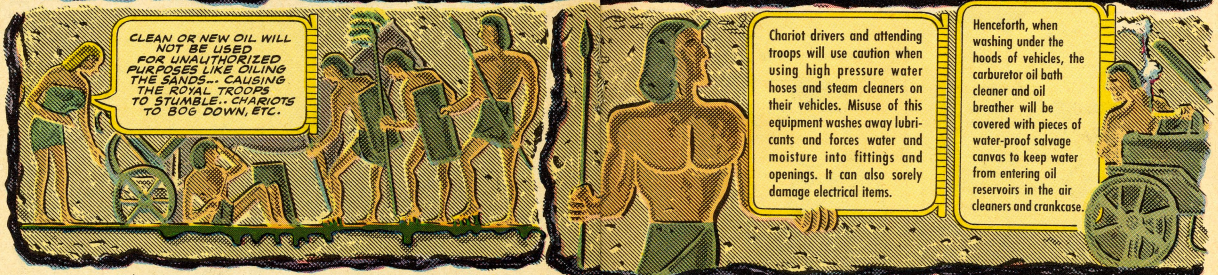
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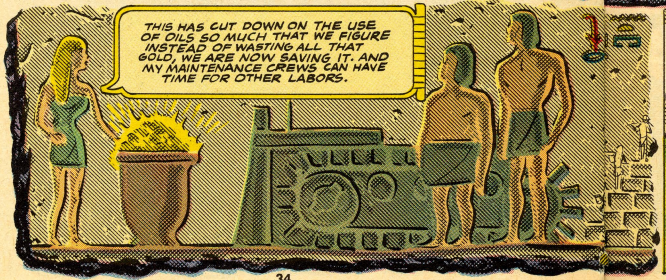
Chariot drivers and attending troops will use caution when using high pressure water hoses and steam cleaners on their vehicles. Misuse of this equipment washes away lubricants and forces water and moisture into fittings and openings. It can also sorely damage electrical items.
Henceforth, when washing under the hoods of vehicles, the carburetor oil bath cleaner and oil breather will be covered with pieces of water-proof salvage canvas to keep water from entering oil reservoirs in the air cleaners and crankcase.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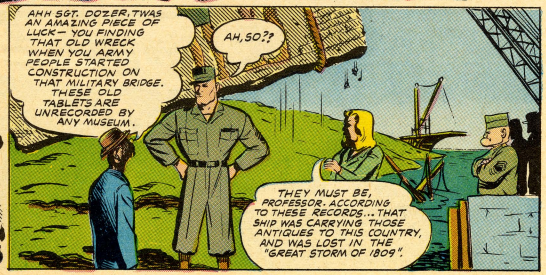
AHH SGT. DOZER, TWAS AN AMAZING PIECE OF LUCK— YOU FINDING THAT OLD WRECK WHEN YOU ARMY PEOPLE STARTED CONSTRUCTION ON THAT MILITARY BRIDGE. THESE OLD TABLETS ARE UNRECORDED BY ANY MUSEUM.
AH, SO?!
THEY MUST BE, PROFESSOR. ACCORDING TO THESE RECORDS... THAT SHIP WAS CARRYING THOSE ANTIQUES TO THIS COUNTRY, AND WAS LOST IN THE "GREAT STORM OF 1809".

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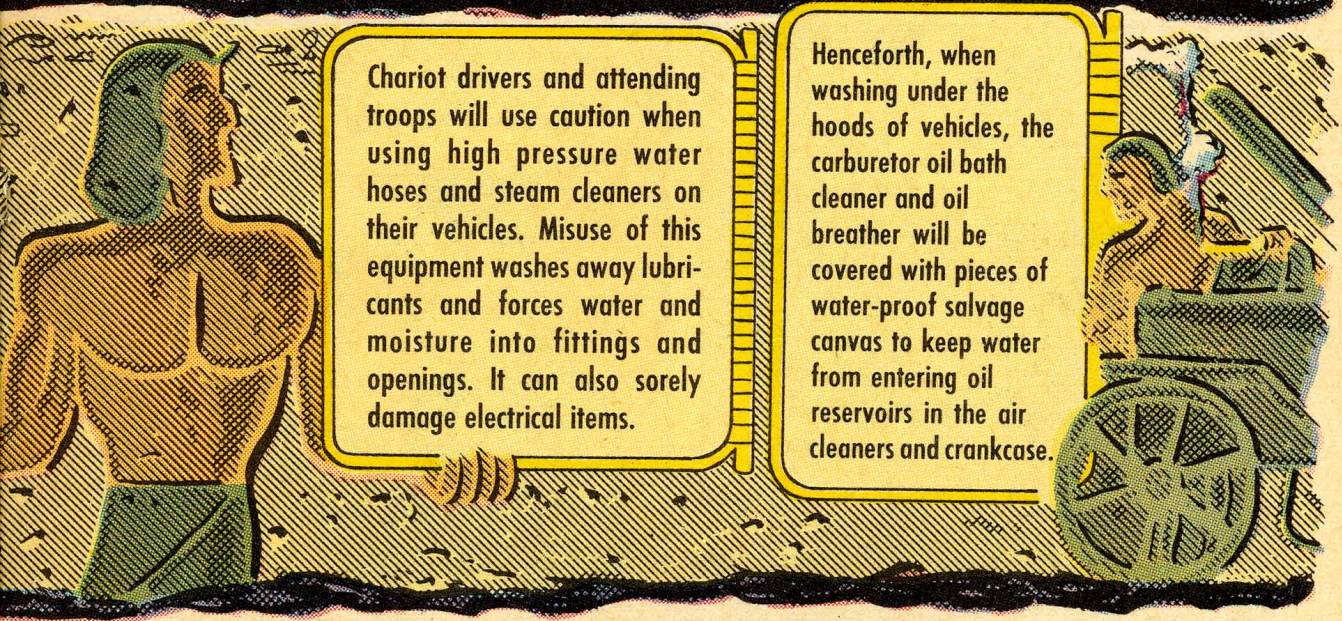
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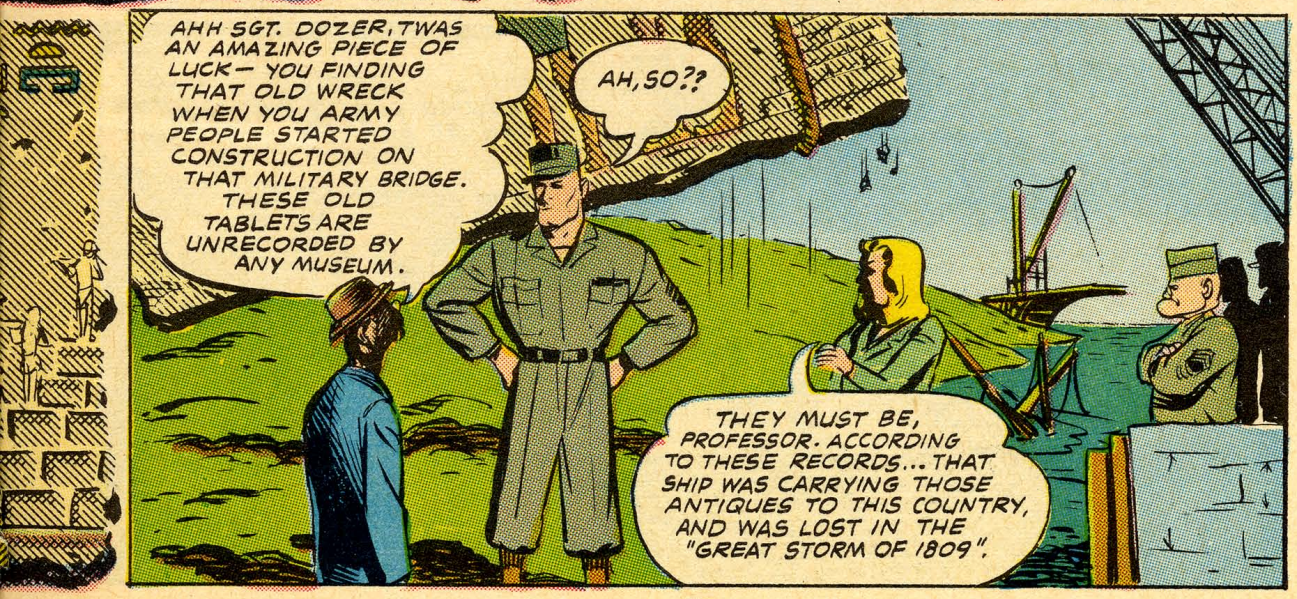
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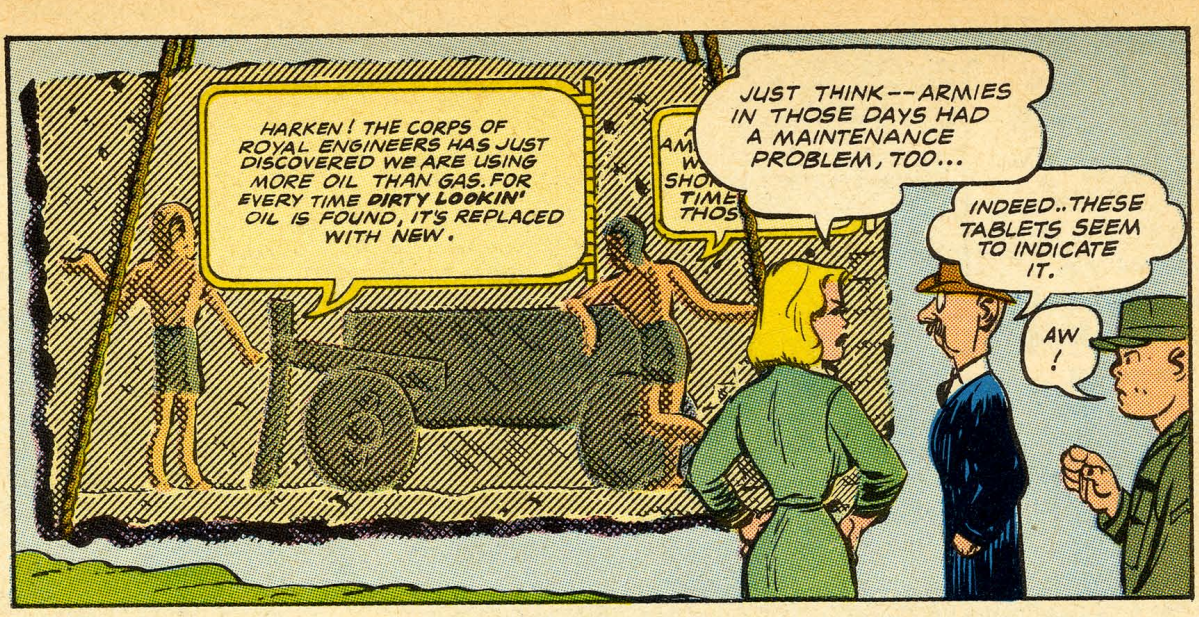
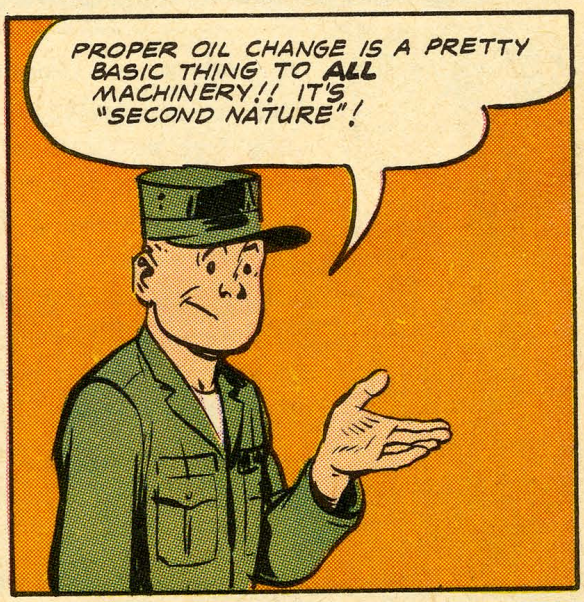
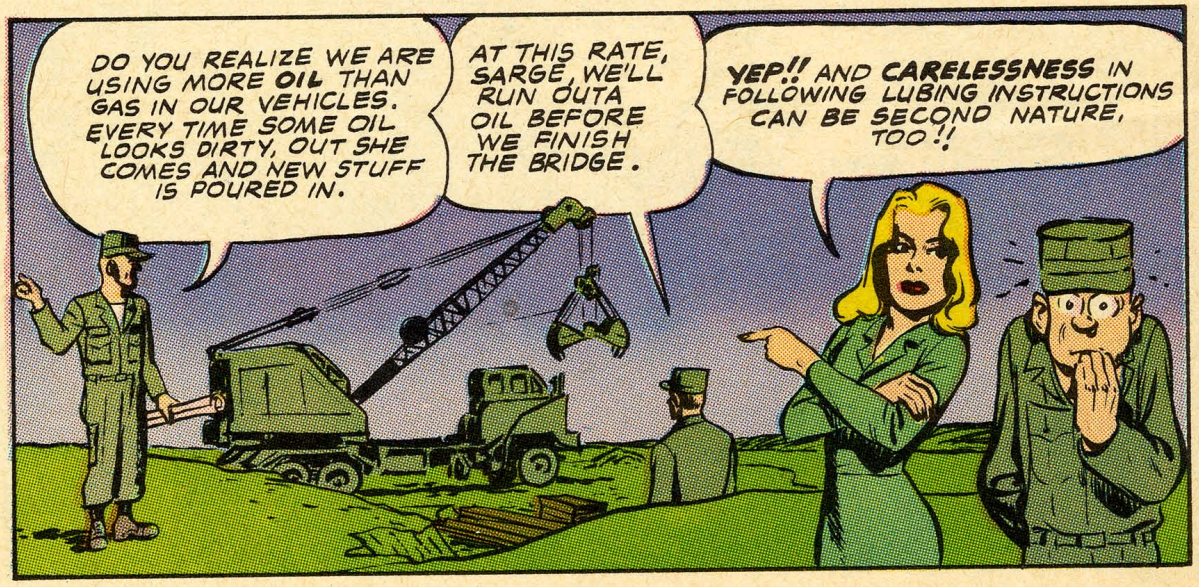
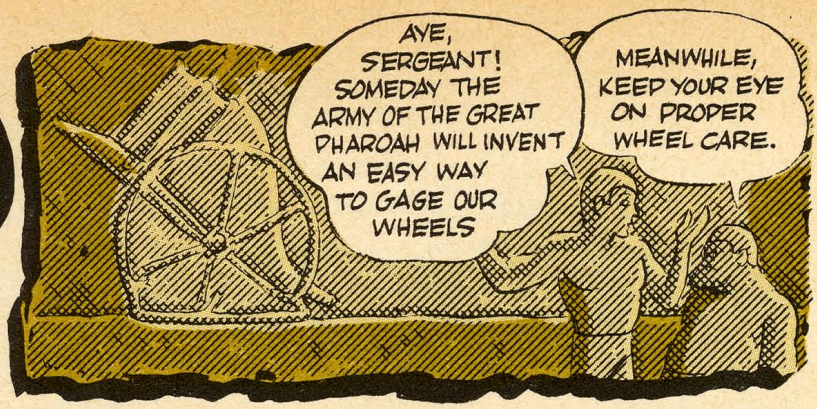

HARKEN! THE CORPS OF ROYAL ENGINEERS HAS JUST DISCOVERED WE ARE USING MORE OIL THAN GAS. FOR EVERY TIME DIRTY LOOKIN' OIL IS FOUND, IT'S REPLACED WITH NEW.
JUST THINK--ARMIES IN THOSE DAYS HAD A MAINTENANCE PROBLEM, TOO...
INDEED..THESE TABLETS SEEM TO INDICATE IT.
AW!

IF MAINTENANCE WAS IMPORTANT TO THEM... CAN YOU IMAGINE HOW IMPORTANT IT MUST BE WITH OUR MODERN COMPLEX EQUIPMENT!
OH I DUNNO!!


PROPER OIL CHANGE IS A PRETTY BASIC THING TO ALL MACHINERY!! IT'S "SECOND NATURE"!


DO YOU REALIZE WE ARE USING MORE OIL THAN GAS IN OUR VEHICLES. EVERY TIME SOME OIL LOOKS DIRTY, OUT SHE COMES AND NEW STUFF IS POURED IN.
AT THIS RATE, SARGE, WE'LL RUN OUTA OIL BEFORE WE FINISH THE BRIDGE.
YEP!! AND CARELESSNESS IN FOLLOWING LUBING INSTRUCTIONS CAN BE SECOND NATURE, TOO!!

QUESTION AND ANSWER DEPARTMENT



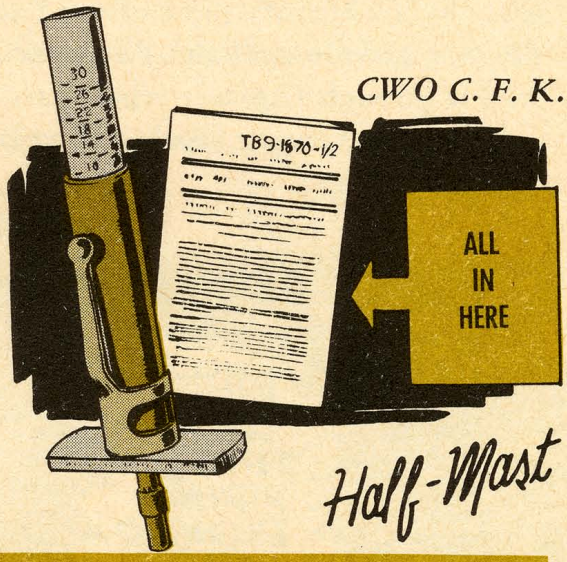
BABY NEED NEW 'SHOES'?

Dear Half-Mast,

I got that new tire depth gage, but now I need some instructions on how to use it.

Can you help me?

CWO C. F. K.



Dear CWO C. F. K.,

Instructions on use of the Gage, depth, tire tread—FSN 5210-357-5951—are in para 5c of TB 9-1870-1/2 (27 Feb 57). Besides info on positioning the gage for an exact reading, there's also a tread depth chart for tire sizes that fit most vehicles.

It's a handy tool to tell you when those tires are too slick for safety.

Half-Mast

SIGNAL FOR A TM

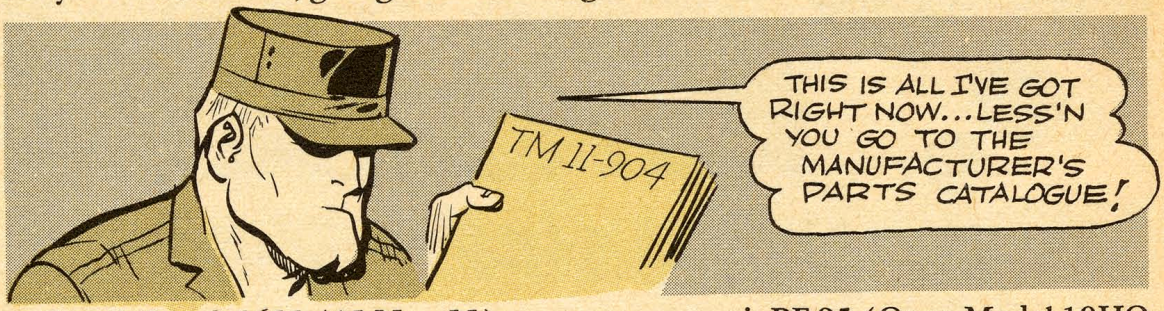
Dear Sgt Dozer,

The PE-95 generators, models A-B-C-F-G and H, are now Engineer items, right? If so, what Engineer TM replaces Signal Corps TM 11-904? Where can we get repair parts? Also give me the number of the latest ENG 7-8 & 9 for these generators.

MSgt R. J. B.

MSgt R. J. B.,

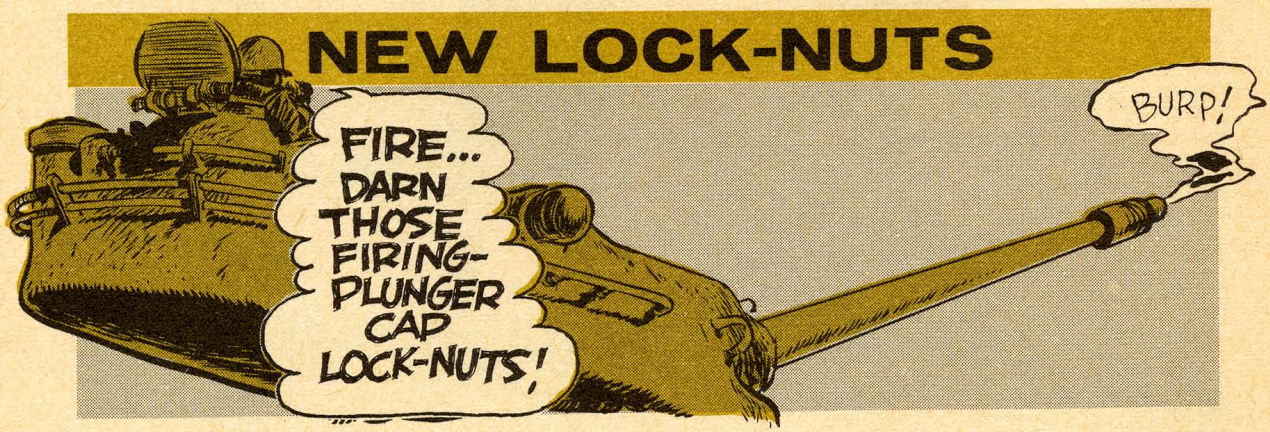
You're right as rain, the PE-95 is an Engineer item—only it's known as a power unit now. But, since TM 11-904, with supplement dated Jan 1952, is the only TM for your PE-95 units, go right ahead using it.



Eng 7, 8, & 9 5655 (15 Nov 55) covers power unit PE 95 (Onan Model 10HQ-3R/552B, Ser. Nos. 491860-492255) FSN 6115-635-2260. However, you can get hold of a Manufacturer's Parts Catalog, Form 918-49, on Models PE-95G and PE-95H, and Onan Model JWC4-10S. You prepare a DA Form 1546 for it and send it through Engineer repair parts supply channels to get your copy.

You can get engine repair and replacement parts through the same channels.

Sgt Dozer



Dear Half-Mast,

Seems some of the firing-plunger cap lock-nuts used to adjust the firing linkage of the 120-mm gun in the M103-series tanks won't work like they ought to. What gives?

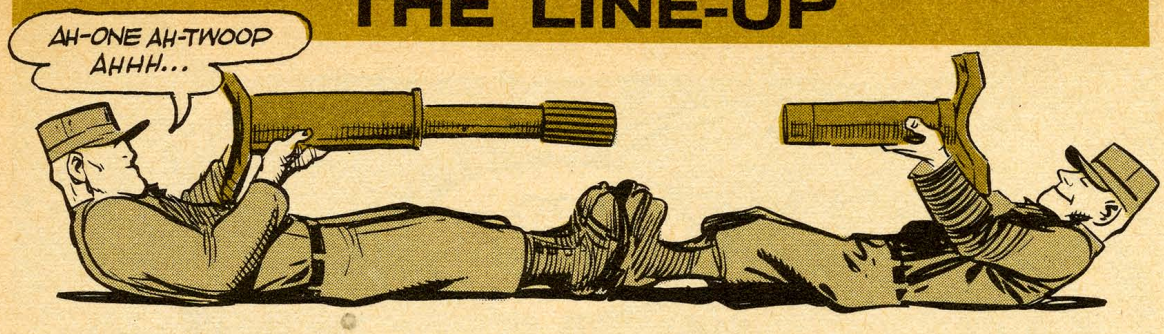
Cpl R. G.

Dear Cpl R. G.,

If you're having this trouble you can now get a new lock-nut that'll give you a positive lock. Here's what to order—Nut, Part No. 124925, FSN 5310-012-4925.

Half-Mast

THE LINE-UP



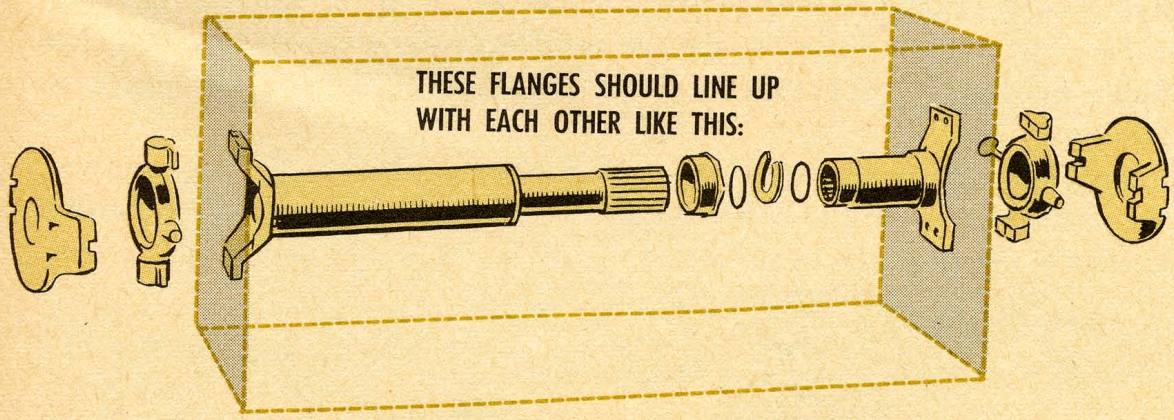
Dear Half-Mast,

What's the right way to install the drive shafts on the M-series wheeled vehicles?

SP3 N. J. K.

Dear SP3 N. J. K.,

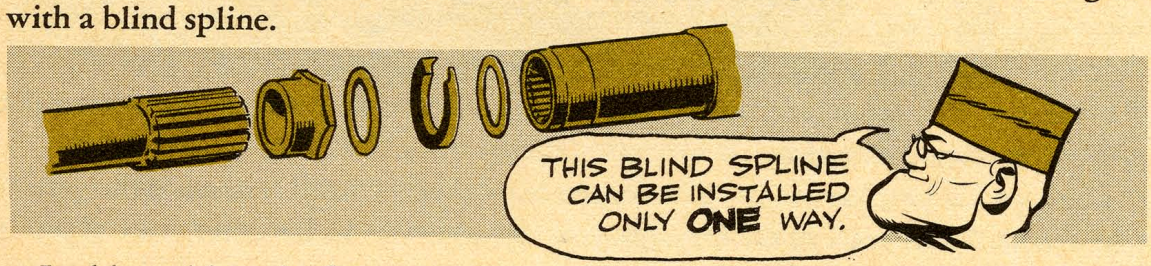
There's one general rule to follow when installing drive shafts on any M-series wheeled vehicle. It's this—



If they don't, the revolving shaft sets up one heckuva whipping action.

If you have a truck with two drive shafts, the flanges on the ends of each shaft must line up, but it isn't necessary for the flanges on one shaft to line up with the flanges on the other.

Some trucks, like the G744-series 5-tonners, have slip joints that are designed with a blind spline.

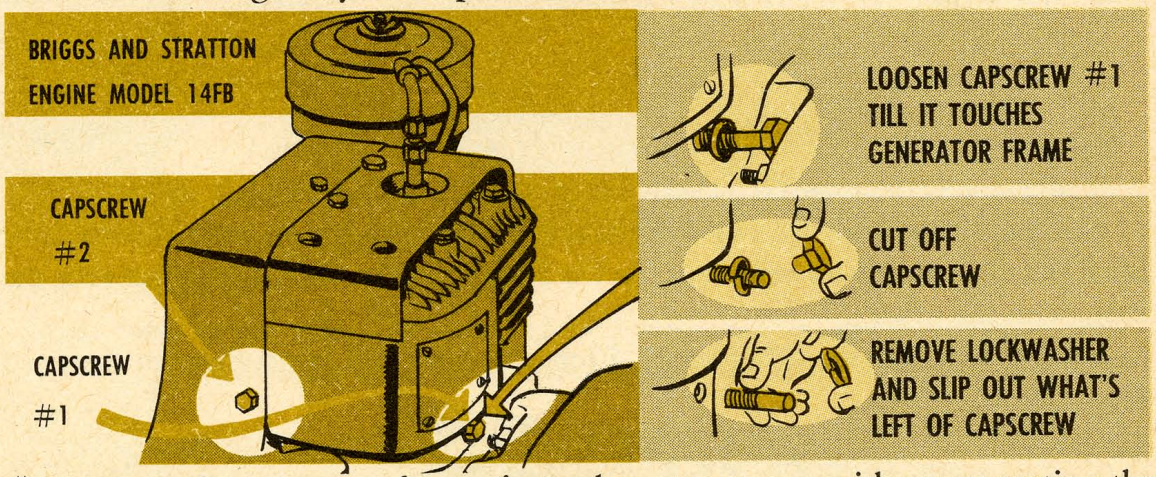


In this position, the flanges on the opposite ends of the shaft will always line up the right way. This knocks all mistakes in the head.

Half-Mast

Have the fins on the engine of your Winpower Model G1528 generator been cleaned lately? Could be your powerful, little one-and-a-half kilowatter'll overheat if dirt and gook pile up on the fins and block off the air. To keep that from happening, you'll want to take the shield off the engine and give the fins a good cleaning.

Now, like the man says, there's more here than meets the eye. First, the tool box, fuel tank, and line have to be removed so you can get at the shield. The shield is fastened to the engine by two capscrews. (We'll call 'em #1 and #2.) Capscrew

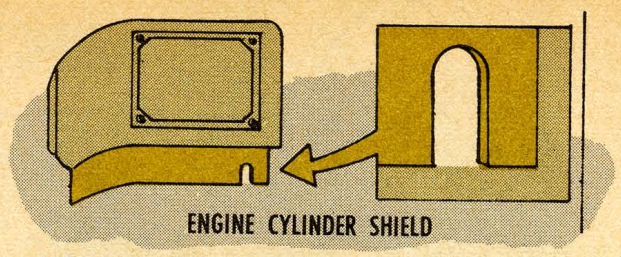


#1, nearest the generator frame, is too long to remove without separating the generator from the engine.

Here's what you have to do. You loosen capscrew #1 until it touches the generator frame. Then you cut off the capscrew, remove the lockwasher, and slip out what's left of the capscrew.

Then you take off the other capscrew (#2) and lift off the shield. With a brush or a cloth, you can get rid of the gook making like a blanket on the fins.

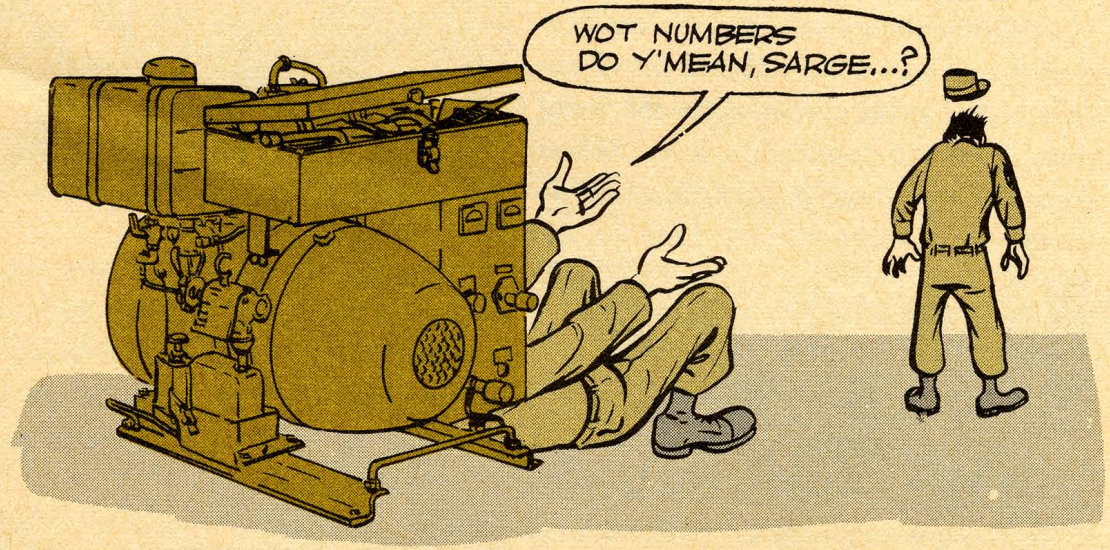
Before the shield is replaced, you want to cut a slot from the bolt hole to the bottom of the shield. Like so. Now, when you put the shield back in place, use a shorter screw. This is what you'll want to take the place of capscrew #1—Bolt, Assembled Washer: cross-recess-hex-hd, int-teeth lockwasher, S, cd- or zn-plated, ¼-20-UNC-2AX 5/16, FSN 5306-696-5114 (ORD).



To complete the job, put the tool box, fuel tank, and the fuel line back in place.

You'll be able to remove the cylinder shield now for easy cleaning just by loosening capscrew #1 and removing capscrew #2.

START BY THE NUMBERS



There're three simple steps that you guys with the Winpower Model G1528 generator sets gotta take when you start your rigs to help keep 'em running headache free.

Be sure the rheostat is in the OFF position.

Make the proper battery connections. This is, make sure the negative generator lead is connected to the negative battery terminal and the positive lead to the positive terminal.

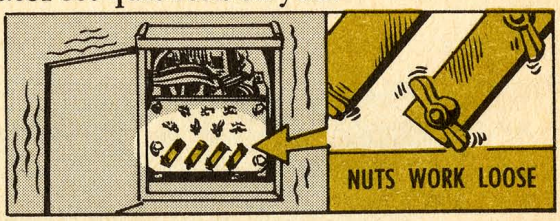
Start the engine and adjust the rheostat control to the right operating position as shown by the red line on the voltmeter.

Keep your cotton-picking mitts off the battery cables when your set's knocking off the RPM's. Connecting or disconnecting the cables when your generator's running damages your reverse current relays.

No relays—no power in your Winpower.

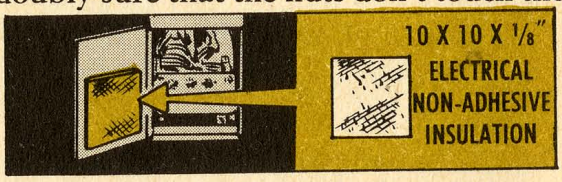
You say your Szekely Model 501 generator set quit cold on you?

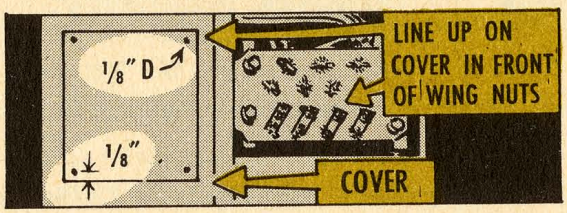
Could be the trouble's in the change-over board box. Hear tell that the vibration of the generator loosens the wing nuts from the connection bars. When the nuts work loose they rub against the metal cover, short out your Szekely, and the wheels stop turning.



To keep your generator knocking off the revs, just slip lock washers, FSN 5310-058-3607 (Ord), between the wing nuts and the connection bars. Thumb the nuts on tight—and you're back in business.

Going one step further, you can make doubly sure that the nuts don't touch the cover by putting a sheet of insulation—about 10 by 10 inches—flush against the inside of the cover. You'll want the electrical non-adhesive type of insulation, ⅛ inch thick. It's a Signal Corps item and goes by FSN 5970-284-9694.



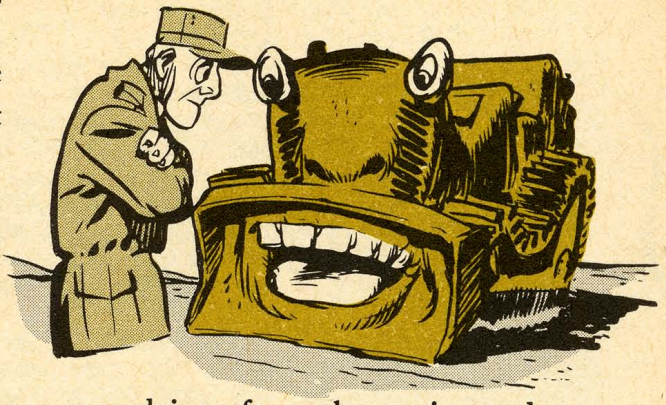


You drill ⅛-in holes in each corner of the insulation . . . about ⅛ inch from the edges. Line it up on the cover right in front of the wing nuts. Then you mark the position of the holes and drill ⅛-in holes through the cover. Put the insulation on with No. 5 x 1/16-in long round-head machine screws, FSN 5305-042-1571 (Ord); lock washers, FSN 5310-058-3597 (Ord); and nuts, FSN 5310-042-6324 (Ord).

YOU CAN BELIEVE IT

Some guys don't believe everything they read.

Like, f'rinstance, the hour or service meters on their Caterpillar equipment that clocks the time their tractors are in operation. These guys figure that if the engine's knocking off the RPM's for an hour, likewise the hour meter should register one hour.



'Tain't necessarily so.

These hour meters on your crawlers are gear-driven from the engine and are set to show the hours of operation at **normal operating speeds.** All the time your dozer or grader is running at low idle, the hour meter is running that way, too. So the reading the meter gives you will be less than the actual operating time, but this is strictly OK.

You don't need a new meter unless yours isn't working at all.

PULL THE PLUG

Sometimes a substitute works out better than the original.

With the drain plug on the fuel tank of your Austin-Western grader, model 99H, that's a sure thing. Draining the water and the contaminated fuel from the tank can be a back-bustin' job since the plug's hard to get at.

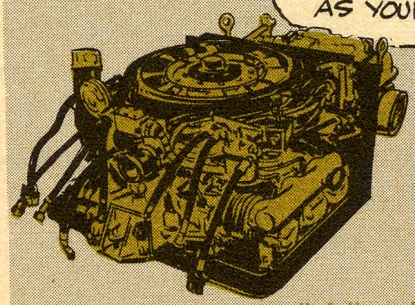
Substituting a drain cock, FSN 4820-033-5972 (ENG), and a bushing, FSN 4730-193-0871 (ENG), for the plug makes the draining routine as easy as tapping a keg of brew. And, the toughest part of making the substitution is getting at the drain plug. Putting the drain cock on is a breeze.

HERE'S THE TROOPER'S PAL, THE

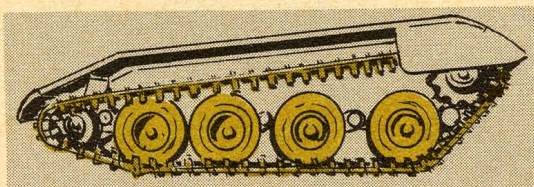
Airborne

YUP, THAT'S RIGHT, YOU BOYS WHO RIDE OUT IN PLANES FOR THE LONG WALK HOME ARE GONNA HAVE A HANDY LITTLE TANK-BUSTER TO TAKE WITH YOU FROM HERE OUT—THE 90 MM FULL-TRACKED SELF PROPELLED GUN, M56, OR SPAT, KNOW FAMILIARLY AS THE "SCORPION!"

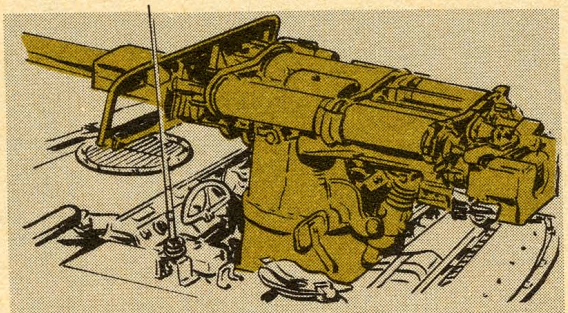
THE WHOLE POINT IS: NOW YOU CAN HAVE THE SAME PUNCH AS YOUR 90MM TANK IN AN AIR DROPPABLE WEAPON.



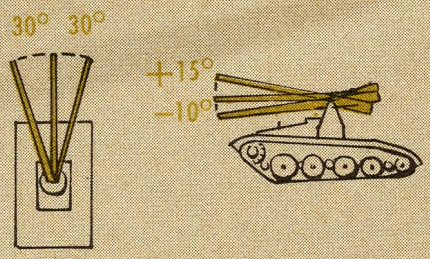
The Scorpion is a small full-tracked chassis powered by a Continental AOI-402-5 (looks like a baby M41 engine) and an Allison CD-150-4 transmission.



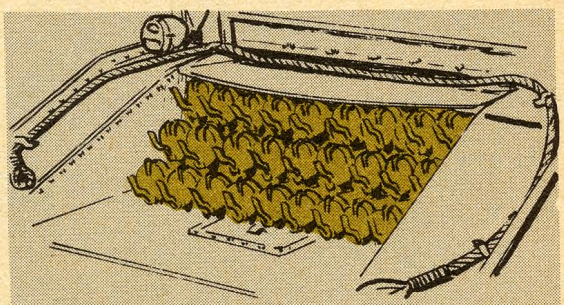
It has four road wheels on a side, with pneumatic tires on 'em. The track is sorta like the Otter track, rubber strips with steel cables inside 'em.



On top of the hull is an M88 gun mount, carrying an M54 90-mm gun.



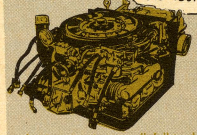
This mount allows 30° of traverse to each side of the center, 15° of elevation and 10° of depression. The gun handles the same 90-mm ammo your medium tanks use.



29 rounds are stored in ready-racks behind and below the gun. There are boxes for 8 grenades, and of course the crew carries their personal weapons. There is stowage for 240 rounds of .30-cal ammo for these.

HERE'S THE TROOPER'S PAL, THE

Airborne Anti-Tank



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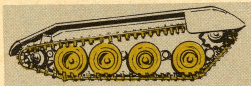

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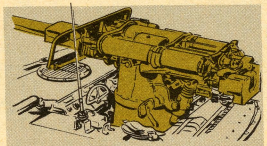
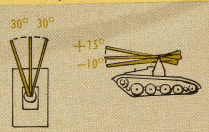


On top of the hull is an M88 gun mount, carrying an M54 90-mm gun.



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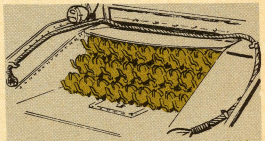

29 rounds are stored in ready-racks behind and below the gun. There are boxes for 8 grenades, and of course the crew carries their personal weapons. There is stowage for 240 rounds of .30-cal ammo for these.

Only this is not a little tank, because she has no armor. In order to be air transportable the weight had to be kept way down. So the hull is made of quarter-inch aluminum, and the weapon sits up on top—no turret.

This little rascal is highly maneuverable. You can turn it on a 6½-ft radius, make up to 28 MPH; and,

since it has only 4¼-PSI ground pressure, you can go over mud, sand or snow where a man can't even walk.

And she'll go up a 60 percent grade, like most military vehicles.

You can cross a 48-in ditch, or work over a 30-in wall. Fording depth, without any kit, is 42 inches, and the kit lets you get 60 inches.

Anti-Tank

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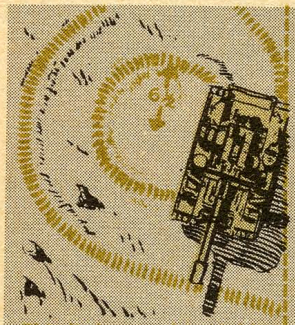

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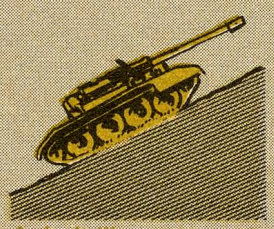

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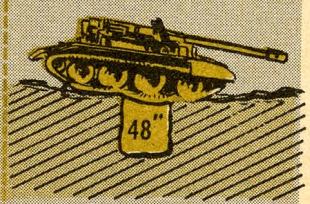

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There are four men in the crew: a commander/radio-operator, the driver, gunner and loader.

THE COMMANDER RIDES ON THE LEFT SIDE SEAT, RIGHT OVER HIS RADIO GEAR,

THE DRIVER JUST IN FRONT OF HIM AT THE CONTROLS.

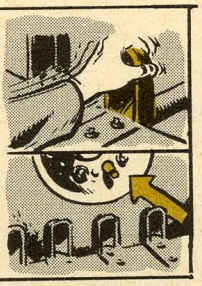
THE GUNNER'S SEAT IS ATTACHED TO THE UPPER PORTION OF THE GUN MOUNT, SO HE TURNS WITH THE GUN WHEN TRAVERSING.

THE LOADER RIDES THE RIGHT SIDE SEAT, BUT, OF COURSE, HE DISMOUNTS TO LOAD THE GUN.

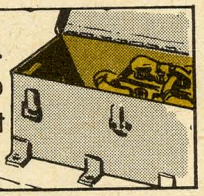
Driver:

BEFORE OPERATION CHECKS:

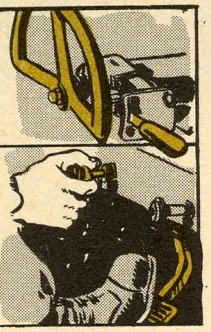
Walks around vehicle, checking for leaks, condition of wheels, tracks and suspension.



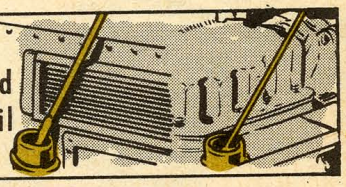
Checks tires for 75-PSI pressure. Looks at lights and reflectors.



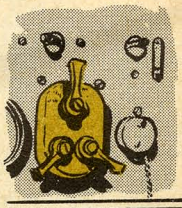
Checks battery electrolyte level. (He'll need a 9/16-inch wrench to remove the exhaust pipe bracket to get the battery box open.)



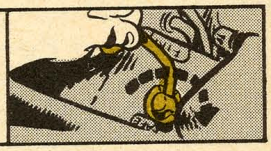
Checks steering and shifting controls for free movement, not binding, not broken, no excessive play (not sloppy). Releases parking brake by stepping on pedal, cycles the brake, and resets by pulling out on parking brake knob.



Checks engine and transmission oil levels.



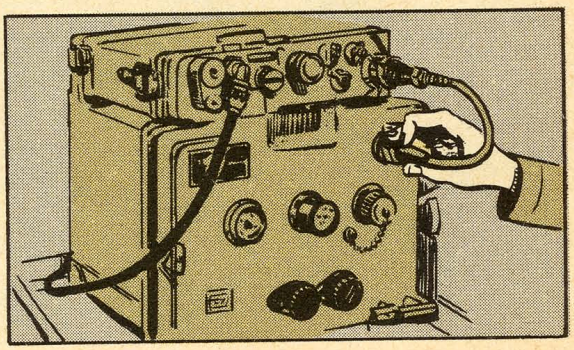
Takes his seat and, if conditions allow, tests lights and horn, windshield wiper, etc. Also operates drain valves to prevent sticking. (Leave 'em closed except when actually draining water—they stick down below the hull when open, and could get smashed.)



Makes sure gun safety lever is in SAFE position.

Commander/Radio Operator:

Checks his equipment, looks at the mountings of the radio and antenna, sees that all the accessories are there, and properly stowed if not in use. If the mission calls for radio contact, he will warm up his set and check into the net.



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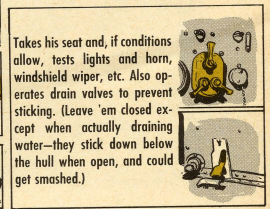
Checks tires for 75-PSI pressure.
Looks at lights and reflectors.

Checks engine and transmission oil levels.

Checks battery electrolyte level. (He'll need a 7/16-inch wrench to remove the exhaust pipe bracket to get the battery box open.)



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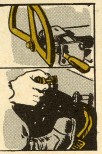

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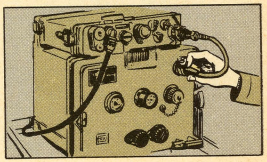
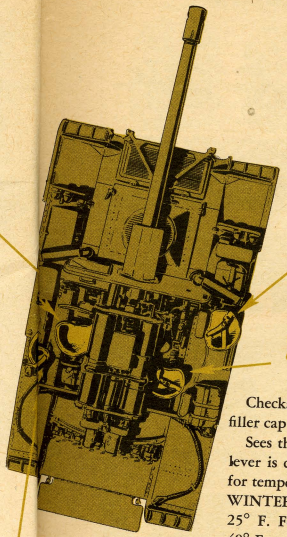
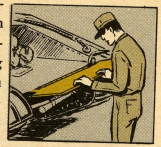


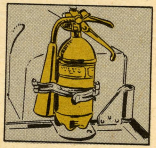


Loader:

Checks loading platform and ready-racks, being sure that an adequate supply of appropriate ammunition is aboard if the mission requires it.



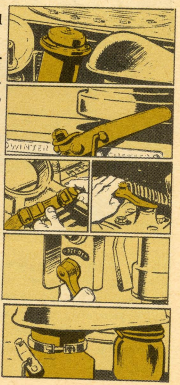
Looks at the pintle hook and the towing and lifting shackles, operates the pintle hook. Checks fire extinguisher. (If the seal's broken, notify support.)



Gunner:

Checks fuel, and sees that fuel filler cap is secure.

Sees that the air cleaner shutter lever is correctly set to SUMMER for temperatures above 40° F or to WINTER for temperatures below 25° F. For temperatures between 40° F and 25° F the lever is set to WINTER to start and warm up the engine, then moved to SUMMER for operation.



Checks gun travel and gun traverse lock to be sure they're secured. (In combat conditions, run with the gun travel lock loose, but secure the traverse lock.)

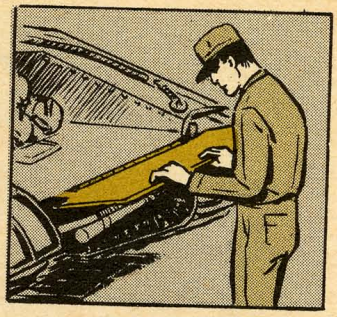
Makes sure gunner's safety switch is in OFF position.

Checks air pre-cleaner, empties jar if necessary, and if particularly dusty operation is expected, checks level of oil in air cleaner oil cup.

Steps down and stands by with the fire extinguisher for starting.

Loader:

Checks loading platform and ready-racks, being sure that an adequate supply of appropriate ammunition is aboard if the mission requires it.



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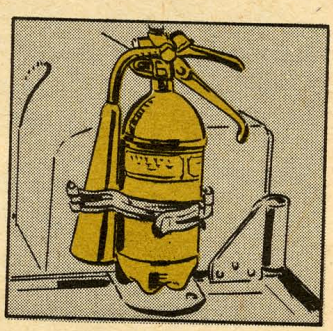
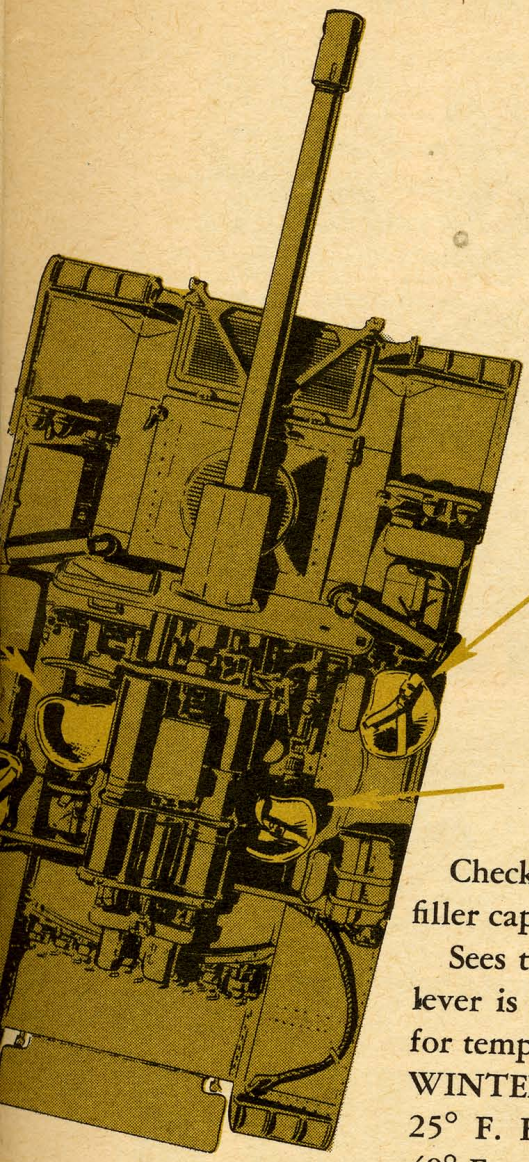
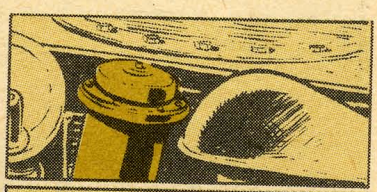


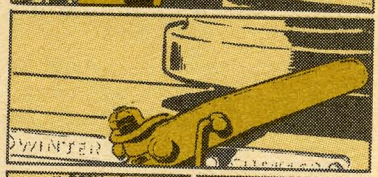


Gunner:

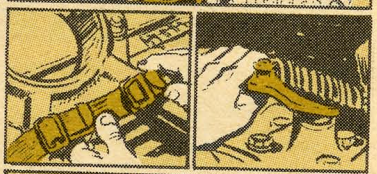
Checks fuel, and sees that fuel filler cap is secure.



Sees that the air cleaner shutter lever is correctly set to SUMMER for temperatures above 40° F or to WINTER for temperatures below 25° F. For temperatures between 40° F and 25° F the lever is set to WINTER to start and warm up the engine, then moved to SUMMER for operation.



Checks gun travel and gun traverse lock to be sure they're secured. (In combat conditions, run with the gun travel lock loose, but secure the traverse lock.)



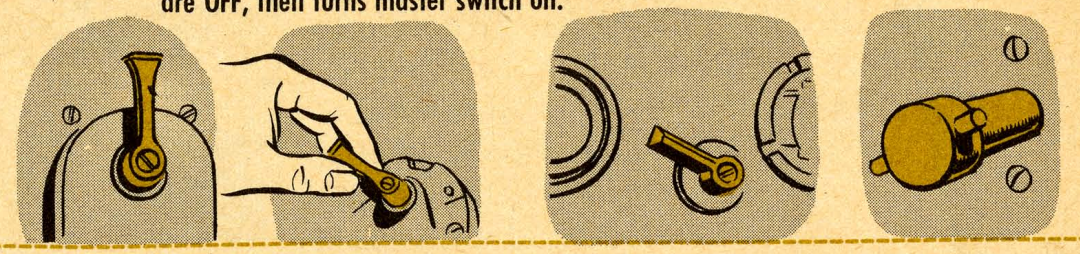
Makes sure gunner's safety switch is in OFF position.

Checks air pre-cleaner, empties jar if necessary, and if particularly dusty operation is expected, checks level of oil in air cleaner oil cup.

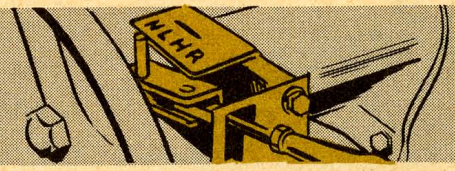
Steps down and stands by with the fire extinguisher for starting.

Starting:

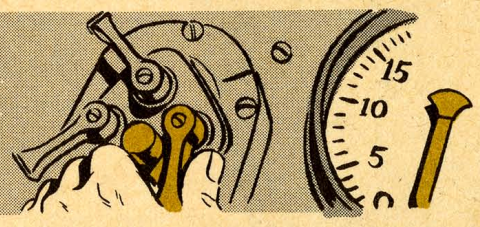
Driver . . . checks to see that lights, magnetos and radio power switches are OFF, then turns master switch on.



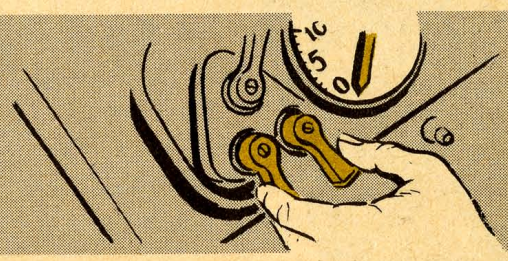
Places shift-lever in NEUTRAL, and sets parking brake—presses brake pedal and pulls out parking brake latch on dashboard.



Tickles starter switch until the engine turns over six to eight times (magneto and booster switches OFF). If it doesn't turn freely, gets hold of support or has the unit mechanics check for hydrostatic lock.

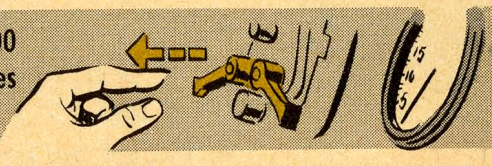


If the engine turns freely, then turns magneto switch on, cracks the hand throttle about ½ inch, and squeezes the starter and booster switches together, primes with the primer pump if necessary until engine starts.

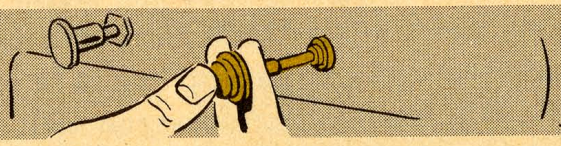


CAREFUL: Prime **only** while the engine's turning over, or you'll cause a hydrostatic lock. Don't hold starter for more than 30 seconds at a time.

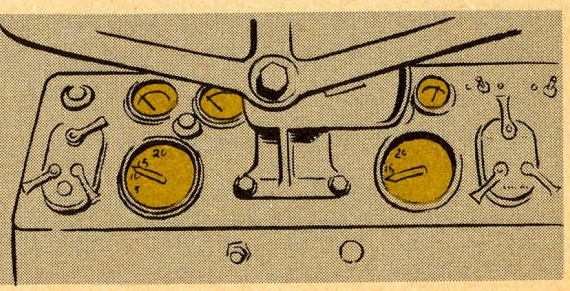
When the engine catches and the tachometer shows 500 revs, releases the starter and booster switches, continues priming if needed until the engine runs smoothly.



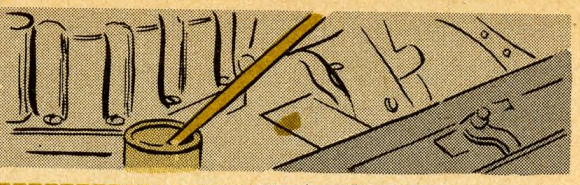
Sets hand throttle to maintain 1200 RPM.



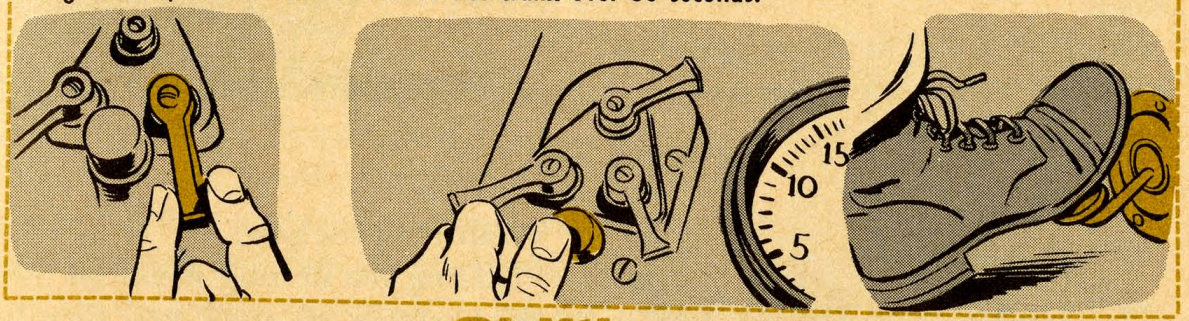
Warms up the engine for about five minutes, and watches the instrument panel. Engine oil pressure should be from 15 to 60 PSI, engine oil temperature should rise to not over 145° F, battery indicator should move to green and transmission hi-temp warning light should not come on.



Re-checks transmission oil with engine idling—it should be between the FULL and the ADD 2 QTS marks on the dipstick.

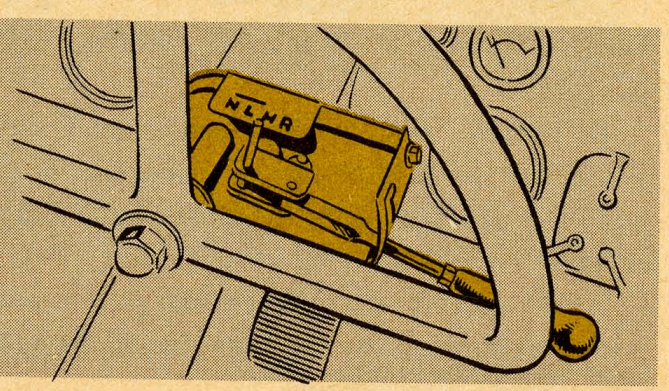


NOTE: Re-starting this vehicle when the engine is hot sometimes gets tricky. Do it like this: (First, check for hydrostatic lock by tickling the starter, but hold down on the fuel cut-off switch while you do it, to prevent flooding the engine.) Do not prime. Try your starter, foot throttle all the way open, don't pump it, and without using the booster. If the engine does not start right off, and you smell gasoline fumes from the exhaust stacks, hold the fuel cut-off switch down while cranking until the engine fires, then release it. But do not crank over 30 seconds.



Shifting:

The shift lever on this vehicle is just under the steering wheel on the right of the column, same as your personal jalopy, and there's a pointer running along the plate to indicate NEUTRAL, LOW, HIGH and REVERSE in that order as you drop the shift selector lever down.



There are two different types of shifter pattern plates on the vehicles. On the earlier type, you dropped from NEUTRAL into LOW, pushed the lever a little way forward to drop from LOW down into HIGH, and then pulled it back to drop on down from HIGH into REVERSE.

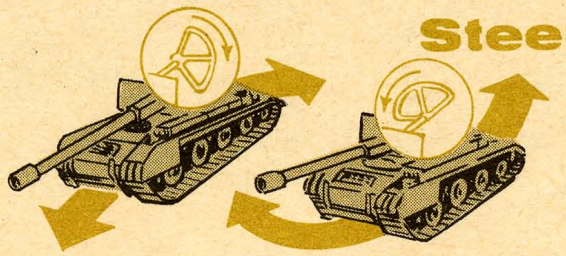
On the later models, you drop down the front slot of the pattern plate from NEUTRAL to LOW, back just a hair and on down to HIGH, then clear back up through NEUTRAL and back hard to drop down the rear slot of the plate to REVERSE. This change was made to prevent you accidentally shifting clear into REVERSE when you wanted HIGH, and to make sure that you only shift into and out of REVERSE when the tank is **stopped.**

There's no connection between the forward and back movement of your shifter lever and the gear you're in. It all depends on the up and down position of the lever. Which means that you actually pass through HIGH and LOW on your way to REVERSE when you're in the back slot.

This is no sweat, just as long as you remember to **stop** before you try to shift outta reverse. But, if you pull that shift lever up while you're rollin' back, you'll find yourself in HIGH with an awful jolt. And some sharpies have been tryin' shortcuts. Just because the tank **will** go forward with the lever in the back slot, they've been drivin' it that way. So, when they hit enough of a bump, she drops from HIGH into REVERSE all by herself. The driver becomes aware of this when his face smacks the windshield.

You, of course, have more sense and some consideration for your teeth.

Steering:



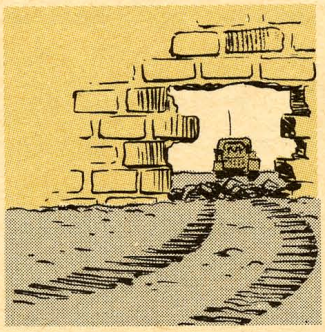
Watch this one now:

Turning the steering wheel on this vehicle slows the track you turn it toward, whether you're moving forward or backward. Therefore, you do **not** have to cross your steering when backing.

In general, steer with a steady pressure on the wheel rather than short jerks, and the farther you turn the wheel, the shorter you'll turn. It is said that you can't upset this vehicle by making a sharp turn at high speeds, but don't bank on it.

CAUTION: You can burn out your transmission if you use maximum steer with maximum power in heavy mud. So, take things a little easy in boggy going.

Driving:

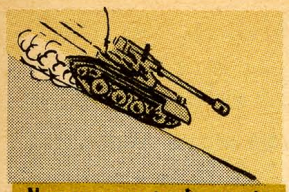


You can start this vehicle in either High or Low range. Use High range for flat hard surfaced roads, and Low range for hills or rough or muddy cross-country. You shift up to High range at any speed when you no longer need the extra power of Low range—that is, when you top the hill or get out onto good going.

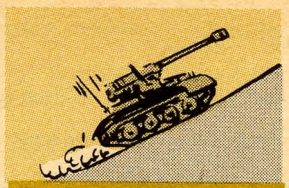
You shift from High down to Low range **only** at speeds **below** 10 MPH. (And brace y'self for a jerk.) And like any other tracked vehicle, you shift from forward to reverse and from reverse to forward **only** when the vehicle is **stopped.**

Here are a few reminders to keep you outta trouble:

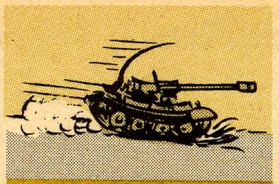
Leave your vehicle in HIGH and pump your brake pedal when going downhill.



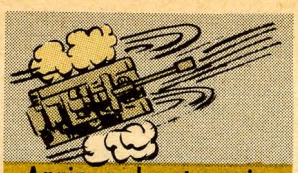
Never coast down in NEUTRAL.



Use Low range for climbing hills.



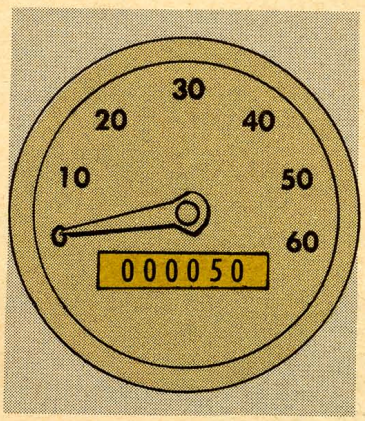
Don't shift down to LOW at over 10 miles per hour.



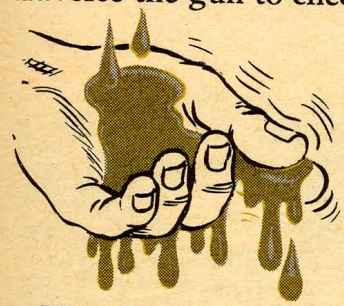
Again and yet again, stop before shifting to or from REVERSE.

If your transmission high temperature warning light comes on, stop, shift to NEUTRAL and hold your engine at 1800 RPM for a few minutes. If this doesn't cool your oil, notify your support unit.

Operation:

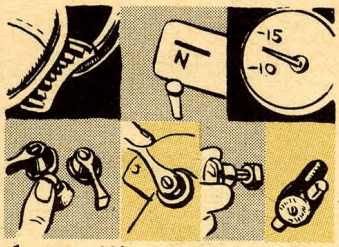


NOTE: There's a break-in requirement for this vehicle when you first get it. Check the odometer and see if it has at least 50 miles on it. If not, you must run a road test for the first 50 miles, paying particular attention to the instruments and warning light. Stop at least every ten miles and make a walk-around inspection of the vehicle, laying your hand on to feel for overheated sprocket-drive universal joints, road wheels or idlers, and looking for any oil leaks. When done, elevate and traverse the gun to check its action.



After the first 50 miles change engine and transmission oil—look carefully for any signs of metal particles. Naturally, if you find any, you contact your support. Otherwise, you use the vehicle normally until the first scheduled service.

Stopping:



You slow your vehicle with the foot brake, of course, and after stopping you shift the gear selector to NEUTRAL. Run your engine about 1200 RPM for a couple of minutes and then press the fuel cut-off button on the ignition switch. After the engine has stopped completely, turn off your magneto switch and set your parking brake by pulling out on the parking brake latch and stomping down on the brake pedal. Turn off the master switch before leaving the vehicle.

When You Stop:

The driver should walk around the vehicle checking for oil leaks and hot suspension bearings, tire damage, etc. Anything coming loose? Check your transmission oil again if you have time—hot reading should be from the FULL mark to one inch above it.

After Operation:

Depending on the time available and the unit SOP, clean the vehicle, looking for oil leaks, hot bearings, etc. Refuel, if possible, being sure to leave ample air space. (Stop when you see fuel in the bottom of the filler neck.) Remember, if you overfill this tank, expansion could force fuel through a defective primer pump and cause hydrostatic lock in the engine. Also, any seepage, leakage or spillage from the fuel filler cap comes out right in the gunner's lap, not outside the vehicle.

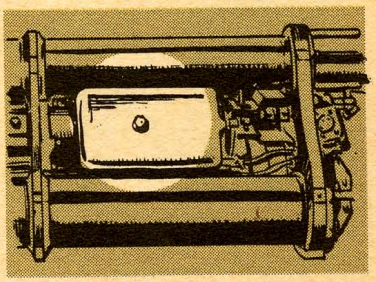
Operate your hull drain valves a couple of times to prevent sticking.

Maintenance:

You lube by LO 9-2350-213-10.

And be sure you've got your TM 9-2350-213-10 on the M56. Your mechanics should have TM 9-2350-213-20 and TM 9-2350-213-20P.

Gun: The M54 90-mm gun on this vehicle is equipped with a long recoil hydro-spring recoil mechanism. By letting the gun travel a long way back, it's possible to absorb the recoil energy of the 90-mm without upsetting the light chassis. However, you'll find she rears up right much when you fire her.



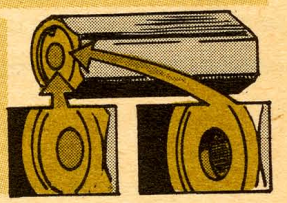
Just forward of the buffer cylinder is the recoil oil reservoir, with a dipstick on its filler cap. You use OHC in this mechanism.

Keep the reservoir filled to the full mark on the dipstick at all times.

Replenishing this recoil mechanism is simple and easy.

The hand hydraulic pump forces oil from the reservoir into the recoil cylinders and the buffer cylinder. There's an indicator on the rear of the right hand cylinder which consists of a hexagonal housing with a pin which moves in and out of a hole in the end.

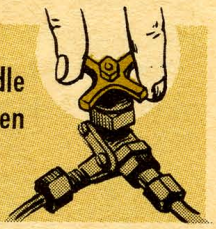
For normal use, firing the gun **and traveling,** you pump oil into the cylinders until this indicator pin is exactly flush with the end of the housing. For firing at maximum elevation, you pump until the pin is about 1/8 inch below the surface of the housing.



This indicator is actually sort of a feeler that shows you the position of the outer, or spring loaded, piston in your recoil mechanism. When you have pumped in enough oil to just begin to move the piston forward against the spring pressure,

the pin comes flush with the housing. This tells you, in effect, that you have taken all the slack out of the system, and have put just the proper pre-load on the recoil springs.

You will find a cross-type valve handle just forward of the reservoir. This is the needle valve which relieves the hydraulic pressure in the cylinders, and if necessary you open it and bleed off oil until the pin is flush with the end of the housing.



The whole thing works pretty much like a big hydraulic jack. If you pump it up too far you can let the pressure down with the valve. If you bleed too much, you can give a couple of strokes on the pump and build it up again.

REMEMBER: This gun must have pressure in its recoil mechanism to hold it in place against road shocks, so you check the recoil indicator pin every day, not just when you plan to fire the gun.

Another thing, you can exercise this recoil mechanism very simply with the valve and pump.

Elevate the gun, being sure nothing obstructs its rearward travel, then open the needle valve, and allow the gun to slide back out of battery as the pressure bleeds off.

Close the valve and pump the gun back into battery, continuing to pump until the indicator pin has moved below the end of the housing for ⅛ to ¼ inch.

This will move the inner pistons the full length of their travel, and overpumping will exercise the outer pistons enough to prevent them from sticking.

Repeat this exercise a couple of times, and finish by bleeding the needle valve until the indicator pin is flush with its housing.

Simple. No cables, no shoving on the tube, no fuss at all.

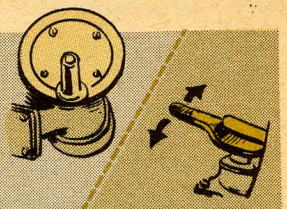
Safety:

It's possible to fire this gun straight forward, or nearly straight forward with all the crew in place on the vehicle. Therefore, you can operate in a ready-to-fire condition when in immediate contact with the enemy, and can take advantage of sudden targets. However, the recoil is going to be most unpleasant, and if the gun is traversed out toward the limits of its travel, particularly to the right, it's going to cramp the commander/radioman, and might injure him when fired. Also, of course, the loader can't reload the gun without dismounting.

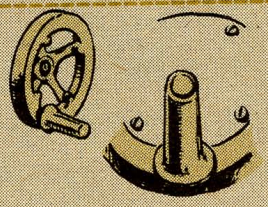
So for anything but sudden around-the-corner first round shots, the loader and commander should dismount.

The commander's radio headset has enough cable to allow him to stand beside the vehicle and still keep contact. Whenever you fire, remember that long recoil,

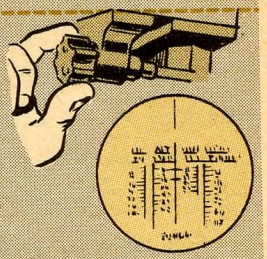
and keep clear of the breech of the gun.



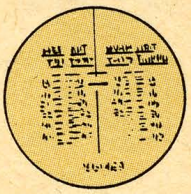
The traversing gear on this gun is manual, operated by a wheel in front of the gunner. On the front center of the mount there is a traverse lock, which is pulled right, or toward the gunner, to release, pushed back to the driver's side to lock. (Always drive with the gun locked.)



The elevation is also manual, and the hand-wheel is at the gunner's left side. The electric firing button is at the end of the traversing hand-wheel's crank handle, fired by the gunner's thumb. Stops on the pedestal limit the traverse to 30 degrees each side of center.

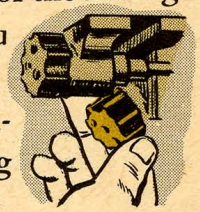


FIRE CONTROL: This gun is sighted by T186 telescope in a T219 mount. The mount is adjustable both horizontally and vertically to allow bore-sighting the telescope and the gun tube. Then there are internal adjustments for range and lead on the reticles of the telescope. You have two reticles, each controlled by a knob under the 'scope. The superelevation reticle has four range tables for your most commonly used ammunition.

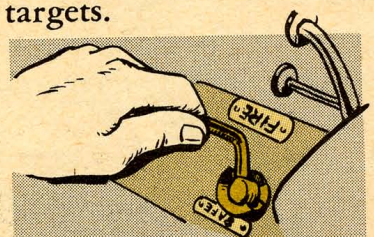


You set it by adjusting the knob until the range line in the table for the round you are firing is on the horizontal cross-hair. That is, for a target at 4,000 yards, on which you were intending to use an AP-T round, you'd put the 40 of the AP-T scale on your horizontal cross-hair.

When you adjust the range, or superelevation reticle, you'll see that the vertical cross-hair is engraved on this glass and moves with the scales. This is because that vertical-appearing cross-hair is not a true vertical; it inclines just slightly from lower right to upper left. This built-in deflection is a compensation for the average drift of the commonly used rounds, and eliminates any need for you to compute or allow for drift.



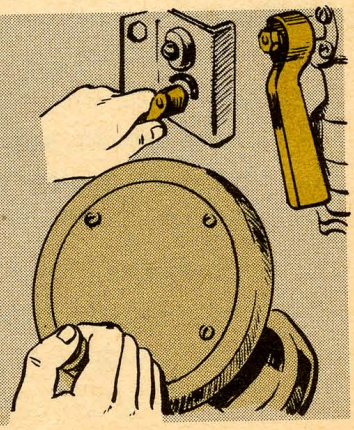
The other knob under your telescope (the one inclined downward) sets the lead, or deflection into your sighting for moving targets.



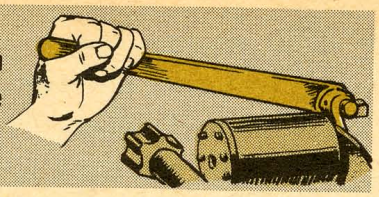
FIRING: Before firing, the gun safety lock lever, mounted on the rear side of the front cross-member, on the driver's side, must be moved from SAFE to FIRE.

When the gunner's safety switch, located on the right side of the gun mount just below the telescope is turned on, the warning light comes on,

and the gun can be fired electrically by pressing the firing switch button on the end of the traversing handwheel crank.

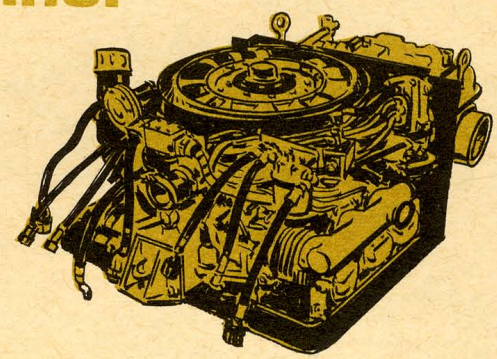


The gun can also be fired mechanically when the safety lock lever is in FIRE position by pulling down on the hand firing lever, located on the right of the gun mounted forward of and above the telescope.



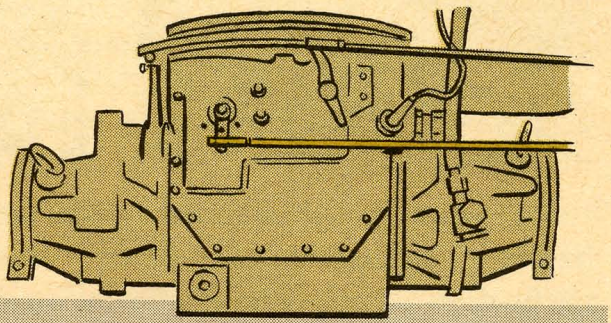
Engine:

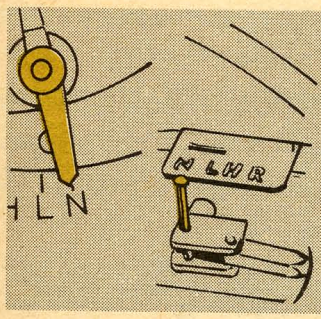
The engine is a Continental AOI-402-5. It is rated at 165 net horsepower at 3000 RPM (which is its governed speed, and gives you 28 MPH in high range when the converter is in lock-up).



Transmission:

ADJUSTMENTS: You'll find the transmission shift-control-arm on top of the transmission, on your right side as you stand in front of the vehicle looking in the transmission door.

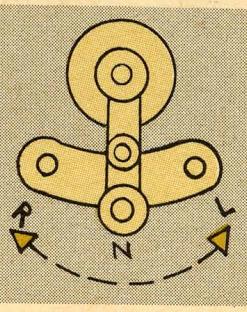




You check the adjustment of your shift linkage by disconnecting the linkage at this arm and making sure that the arm is in its detent for NEUTRAL. Then shift the selector lever in the driver's compartment into NEUTRAL, and adjust so the linkage and arms back at the transmission holes aline perfectly.

Check by moving both the shifter lever and the transmission arm to all the shift positions and make sure the hole in the arm and the hole in the linkage still line up. (If they don't, look for bent linkage.)

The steering linkage is not so tricky. Just be sure that when the wheel is centered, the steering arm on the transmission is on the **N** mark, and that it travels fully out to the **L** and **R** marks when you swing the wheel all the way over.



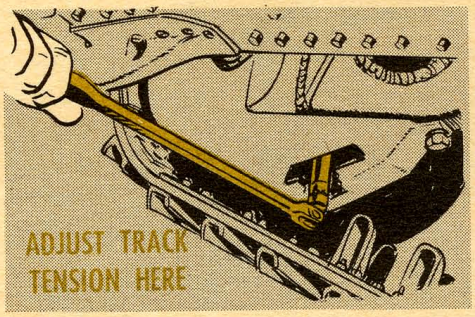
This steering control indicator is on your left as you look in the transmission door, and since the **rear** of the transmission is at the **front** of the vehicle, it indicates **L** when the wheel is turned **right** and vice versa.

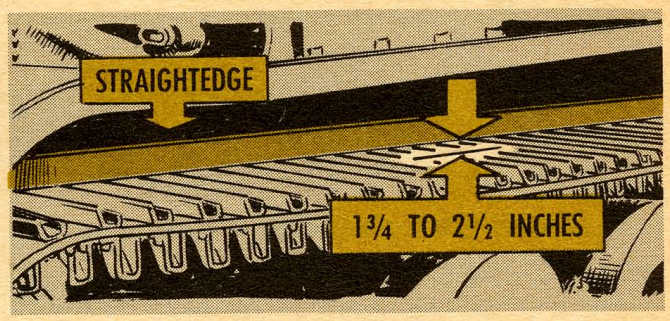
Once more, if the indicator is not in the center when the wheel is centered, adjust the length of the linkage; but if it is centered and will not give you travel, look for bent linkage.

There is no internal adjustment for the brakes. Take up on the linkage as needed—and when you can't get a tight brake, notify your support unit.

Remember, using hard steer at full power in heavy mud has been known to burn out these transmissions. Gently, gentlemen, please.

Suspension:

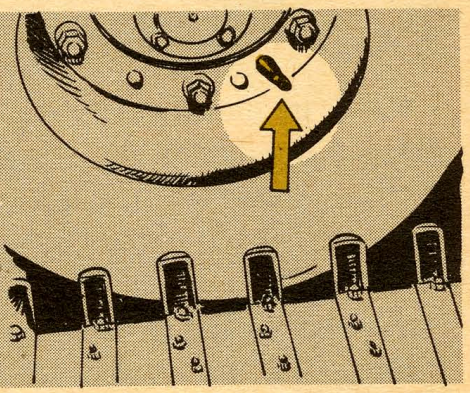




This vehicle has a torsion bar suspension. There is a solid bar, called the primary bar, fitted inside a hollow secondary bar. Normally the primary bar carries all the load, but in severe conditions the secondary comes into play and takes part of the load . . . sorta like over-load springs on a truck.

From where you sit, the happiest thing about this suspension with its rubber and steel cable tracks is that the tension lasts. The steel cables inside the rubber belts kink a bit from the constant flexing, and the track gets shorter instead of wearing loose.

The track is self-alining, and about all you have to watch out for is the tire pressure (75 PSI). In fact, if you lose the air from a tire, you can run as much as 15 miles at 15 MPH without hurting the tire. Keep an eye on the bolts that join the sections of track. In the event of **damage**, you can replace one or more sections of the track as needed. However, it is best to replace an entire track when replacing because of **wear**.

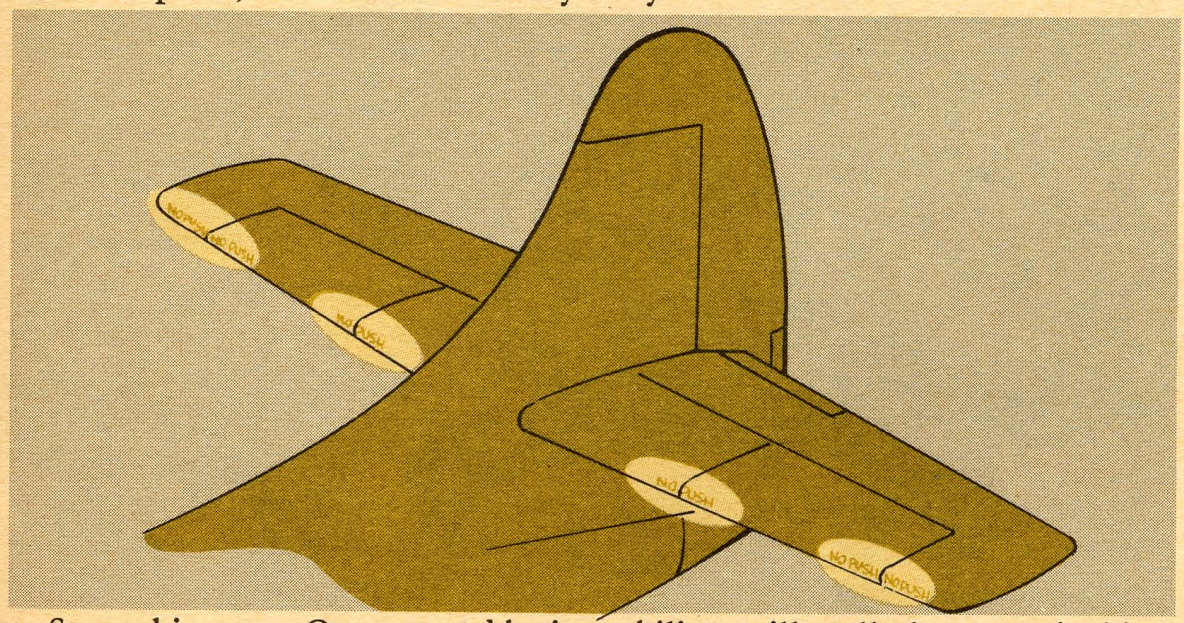


So, Troopers, that's your new shootin' iron. You don't pack it . . . it packs you. Please to treat it right tenderly in your training operations, so if you have to drop it into trouble, it'll still have life and condition, to go with you and fight for you. You'll find it's a mighty good friend to have under you in a hotspot.

ARMY AIRCRAFT
KEEP PONDEROUS PAWS OFF

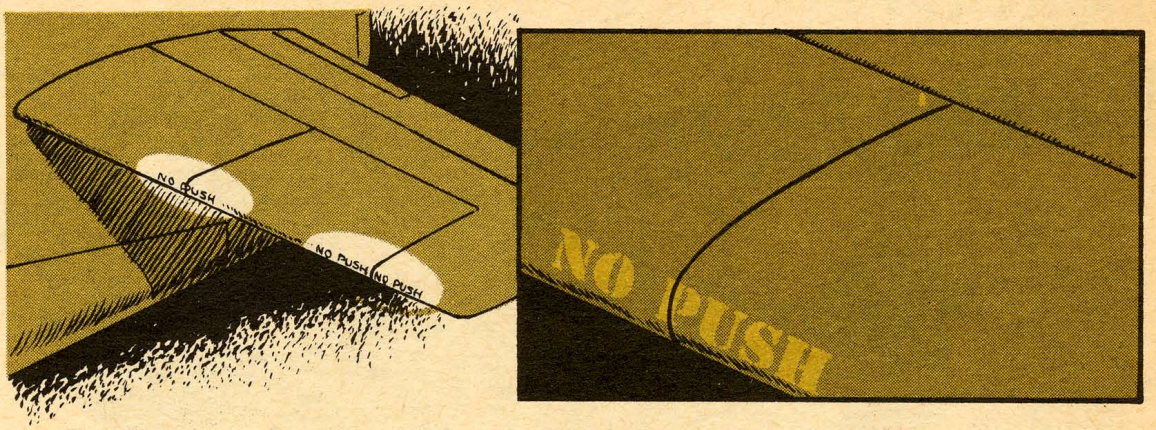
Off the leading edges of your OTTER (U-1A) horizontal stabilizer and elevator counterbalances, that is.

You know that aircraft are fairly rugged machines, and have been designed and stressed to take a terrific beating when in flight. Trouble is, the strains from flight can be predicted, and allowed for. Nobody can accurately predict where strain from rough ground handling will come, and if they tried to beef up the whole airplane, it would be too heavy to fly.



So, pushing your Otter around by its stabilizer will really louse up the hinge supporting structure, and that you don't want.

TM 1-1U-1A-1002 says you stencil "NO PUSH" signs in letters one inch high, one with "P" in PUSH centered on rib No. 5, one ending one inch from the outboard end of the horizontal stabilizer, and one on the elevator counterbalance



horn beginning one inch outboard of the end of the horizontal stabilizer. (The second sign begins two inches from the end of the first one, with no allowance for the clearance between the stabilizer and the elevator horn.)

This is for all YU-1 aircraft with serials 55-2973 through 55-2978, all U-1A aircraft with serials 55-3244 through 55-3327 and on any replacement stabilizers or elevators for these aircraft that don't already have the message. After serial 57-6107, they'll do this at the factory.

DON'T GIVE ME STATIC

At least, not from a hovering whirlybird.

It's not too often that you have to approach and lay hand on a hovering bird, particularly after it's been in flight for some time. But when and if you do, there's a fine chance that you'll get jolted by an electric shock as the static electricity accumulated on the aircraft discharges through you to the ground.

Actually, while the potential of this charge can easily be in the neighborhood of 25,000 volts or even more, the amperage is so slight that you are in no dan-

ger from the shock—except that it may jolt you so that you jump, possibly into danger, or drop something. Not to mention the nervous shock.

But there's a real simple answer, based on the fact that static electricity discharges best from a sharp point. If you'll take a pocket-knife, a screwdriver, a short piece of welding rod or even a house-key and point it to the aircraft as you approach, the charge will leak off harmlessly through the key into your hand and through you to the ground with only a slight tickle. (Naturally, if you use an insulated or plastic-handled screwdriver, you'll have to let your finger touch the metal blade firmly to provide a path for the charge.)

Move your sharp point in slowly for the last three inches, and touch the metal of the aircraft firmly. What is called corona discharge will take place, and you won't have a spark, and won't get a jolt.

Ever have your fly-buggy come down with a big red X and strand you far from home and you with a heavy payday date comin' up?

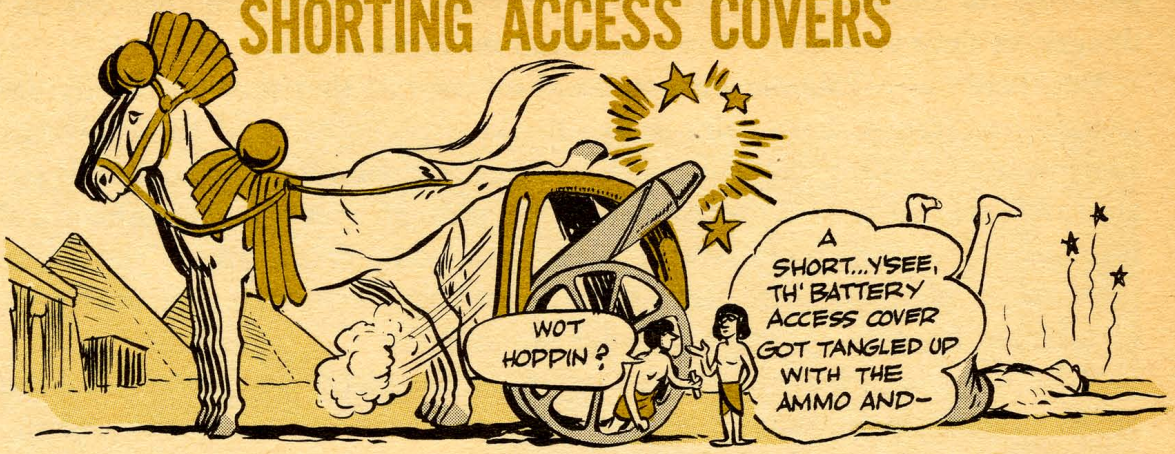
So, naturally, the support people at the field you're down on will do everything they can to get you flying again.

But if it happens they don't have the parts you need, and can't get 'em on local purchase, it won't hurt any to remind the boys of USATSMC Supply Letter SL 65-58 (13 Oct 58).

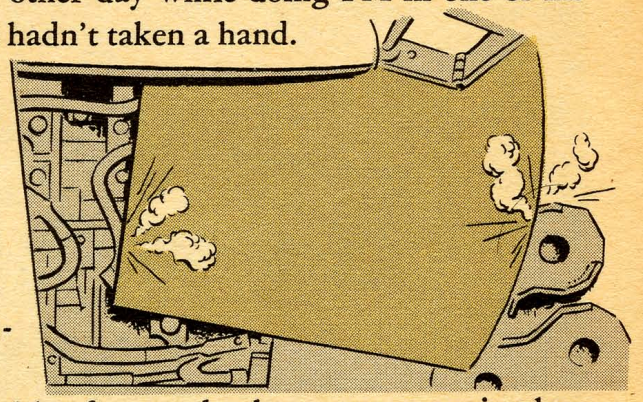
This can get both of you off the hook—in time to keep your date if you're lucky.

That supply letter tells the local field maintenance outfit to telephone for help to the US Army Transportation Supply and Maintenance Command in St. Louis. It goes on to give the extension to call, and the man to ask for, which vary according to where you are.

SHORTING ACCESS COVERS



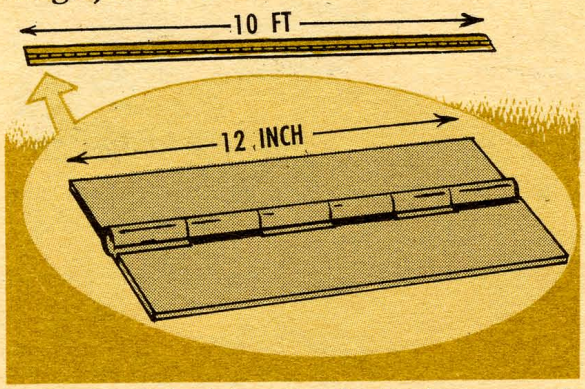
An operator almost lost his life the other day while doing PM in one of his tanks. Would have, too, if ol' lady luck hadn't taken a hand.



Somehow or another, a battery access cover got tangled up twixt the ammo ready round rack and the positive (hot) terminal of the battery. This in turn created a short circuit that set off one of the rounds.

This can happen on any M48, M48-A1, M48A2 or M103A1 tank.

To stop this Ordnance has come up with a fix to make those covers stay in place . . . no more short circuitin'. The new deal is a piano hinge put on the covers and the turret floors. So get your tank back to your support unit soonest to get the hinge job done.



Here's the hinge that's needed on all the tanks:

Hinge, Butt: S, 1/8 thk, 4-in. width overall, .375 pin dia, length 10-ft, FSN 5340-543-3446.

The M48A2 will need these besides the hinge:

Nut, Plain, Hex.: 3/8-16UNC-2B, 9/16w, 21/64 thk, FSN 5310-012-0377.

Screw, Machine, fl-hd, S, cd- or zn-pltd, 3/8-16UNC-2A X 3/4, FSN-5305-013-3891.

Washer, Lock, split, keystone, S, cd- or zn-pltd, 3/8-in bolt size, FSN 5310-018-7123.

The job is done like this:

Before any welding is done, remove the floor access cover and put the turret through a 360° cycle. Keep that sniffer sniffin' for any smell of fuel vapor and

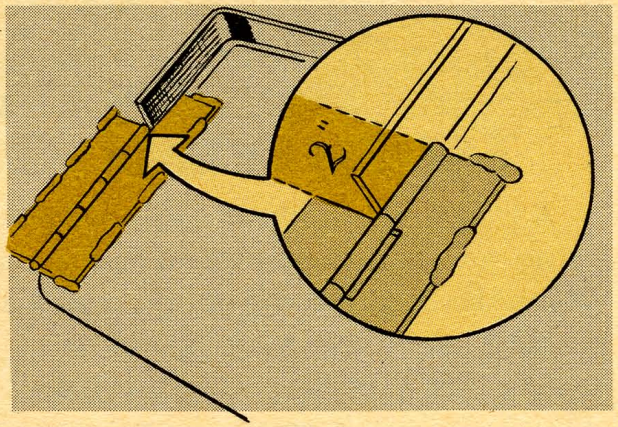
check for leaks. If fumes are found, check 'er out and straighten out the trouble before doing any welding.

Remove the batteries and do your welding right over the battery carrier... this being the safest spot.

Cover the electrical components under the turret with some sort of fire-proof material and have the fire extinguishers handy just in case.

Center the covers in place.

Remove all paint, grease and dirt from the area to be welded. A wire brush and paint remover'll do a good job.

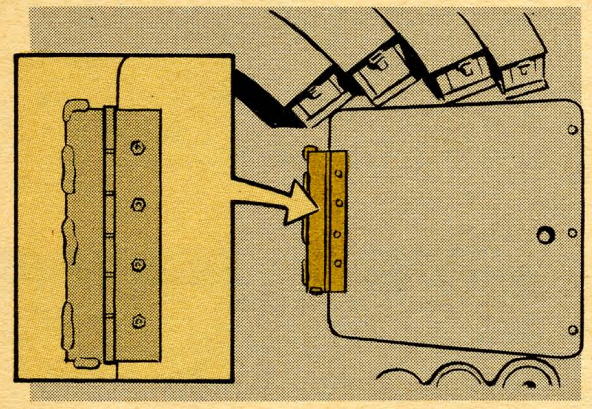


Before hinges are used they'll have to be cut down to size. They come in 10-ft lengths and get cut into 12-in lengths. Their ends will need peening to keep the pins in place.

On the M48 and M48A1 tanks:

Before the hinge can be put on the covers, a wee bit of modifying has to be done to the hinge. One side gets a 2-in piece taken out of 'er like this:

Weld 'er to the cover and the turret floor.

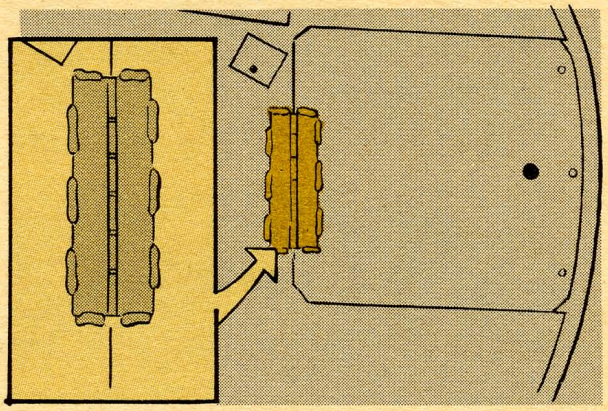


On the M48A2 tank:
Because of the aluminum covers in 'em the hinge'll get bolted to the covers and welded to the floor.

Put covers in place and drill four $^{25}/_{64}$-in holes through hinge and cover. Turn the cover over and countersink each hole with a $^{3}/_{4}$-in drill or $^{3}/_{4}$-in countersink bit so the bolt heads won't keep the cover from closing flush with the deck.

Now arc-weld hinge to the turret floor.

On the M103A1 tanks:
Just weld 'er in place.



When these battery covers are hinged they're as immovable as the Rock of Gibraltar. No more jumpin' around for them. Always be sure to get the hold-down screws at the opposite side of the hinges put back in place so the covers are kept good 'n' snug.

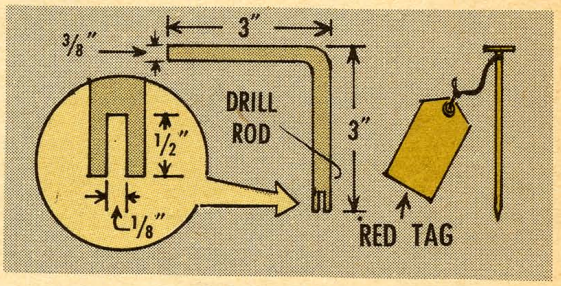
The last step is to clean and paint the welds like it says in TM 9-2851 and of course remove the fire-proof material from under the turret—and you're in business.

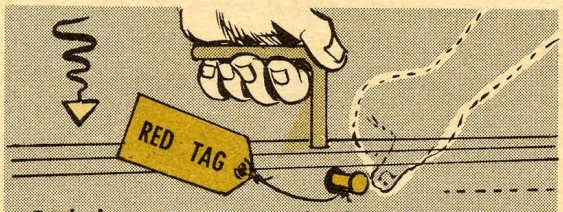
TOOL YOU CAN HANDLE

A screwdriver works all right, but you don't do the screwdriver a bit of good when you use it to push down on the rod in the T-track so's you can raise your Nike-Ajax launcher without the missile aboard.

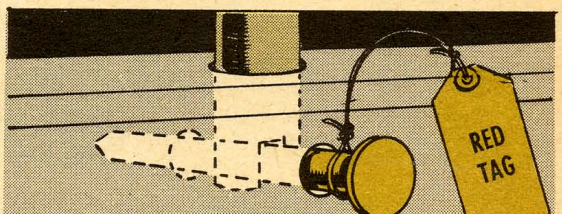
What you ought to do is ask your support unit to whip up a tool that'll do the job. And here's one that'll work real good.

All you have to do is stick the slotted end of the tool in the hole on top of the T-track, just like you've been doing with the screwdriver.

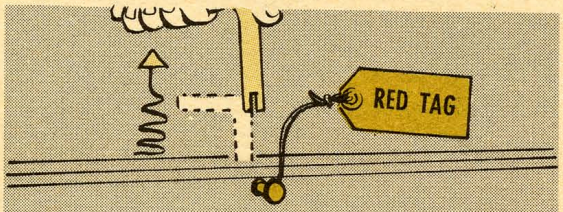




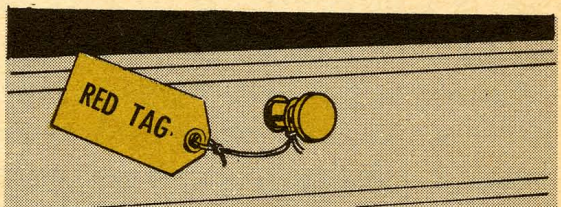
Push down so's you trip the down limit switch and then slip a 6-penny nail through the one hole under the track . . .



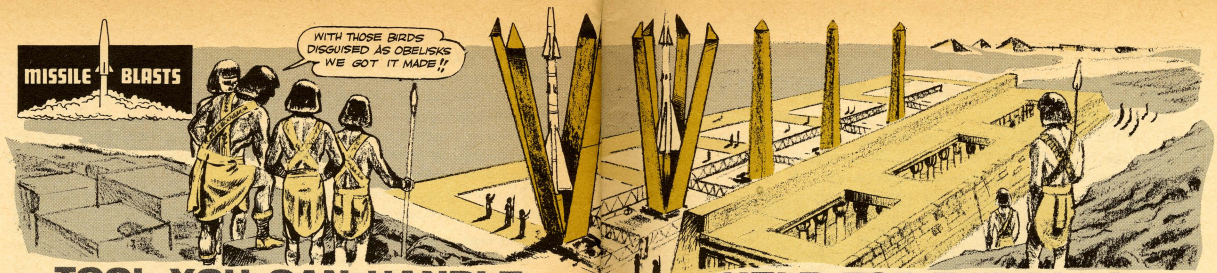
on through the slot . . . and out through the other hole under the track.



The nail holds down the rod and you can lift up the tool with no sweat.



Play it shrewd, tho, by tying a bright colored cloth on the nail so you'll remember to take it out.



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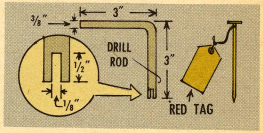

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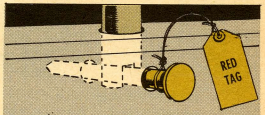

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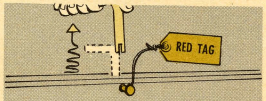

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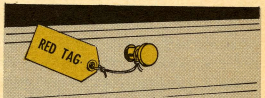


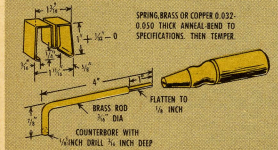
Play it shrewd, tho, by tying a bright colored cloth on the nail so you'll remember to take it out.

HELP FOR THE PLUG

Are you one of those guys who'd like to get your hands on something to help keep the ground power plug on your launching and handling rail in shape? You're in the same boat as a lotta other guys at Nike-Ajax sites then.

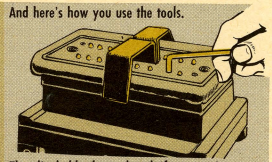
Your problem's solved, here and now. What you need are a few tools that'll give you a hand in checking each contact pin to make sure it's clean, not binding or broken. They'll also tell you if the pin springs are busted or not lubed enough.

These are the tools . . .



and your support unit's the place to have 'em made up.

And here's how you use the tools.



The clip holds down the platform to give you a good look at the pins . . . and the other tool lets you work the pins up and down.

A PEEK A DAY . . .

Pays to eyeball the floor tunnels regularly in your Nike-Ajax pits to make sure rust and corrosion haven't found a home with the B-nuts and fittings. One outfit had to replace all the lines in one casemate because of this. One of the first signs of trouble is hydraulic leakage.

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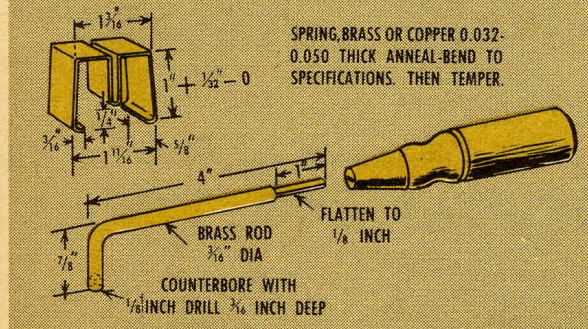

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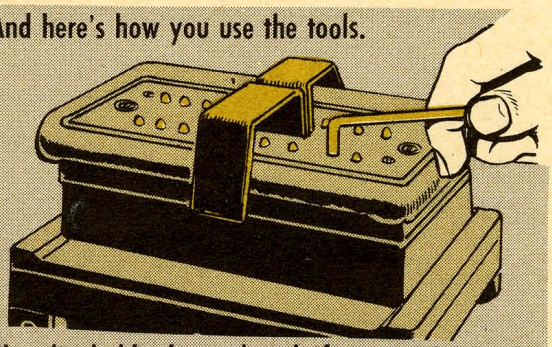

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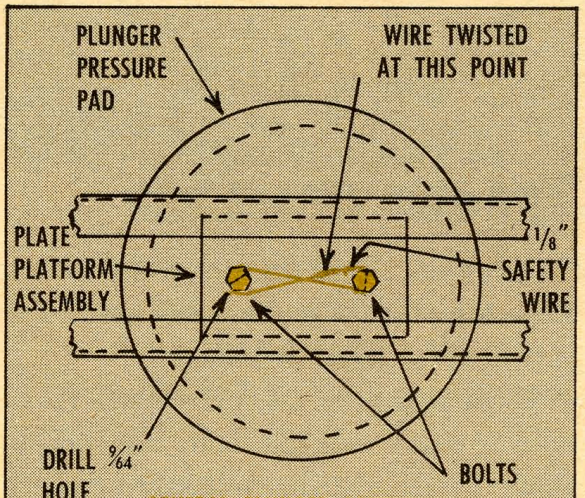
NIKE ELEVATOR . . .

YOUR BOLTS WIRED?

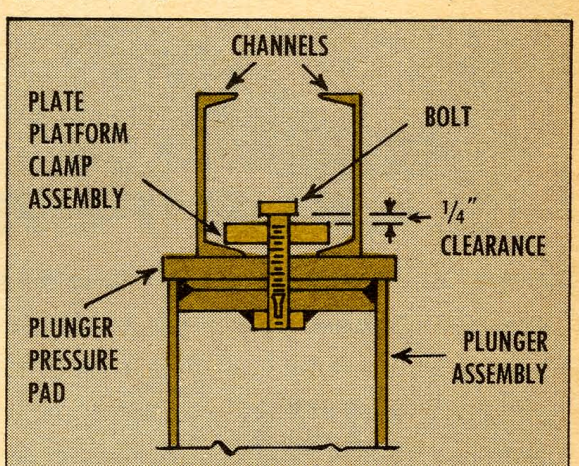
We're talking about the ones on the clamp assembly on the elevator at your Nike site. They're the bolts that hold the platform to the main cylinder plunger.

Give these bolts (Part No. NE 10117) a look-see and if they're not wired to keep 'em from turning—holler for your support people.



GENERAL PLUNGER ASSEMBLY TOP VIEW

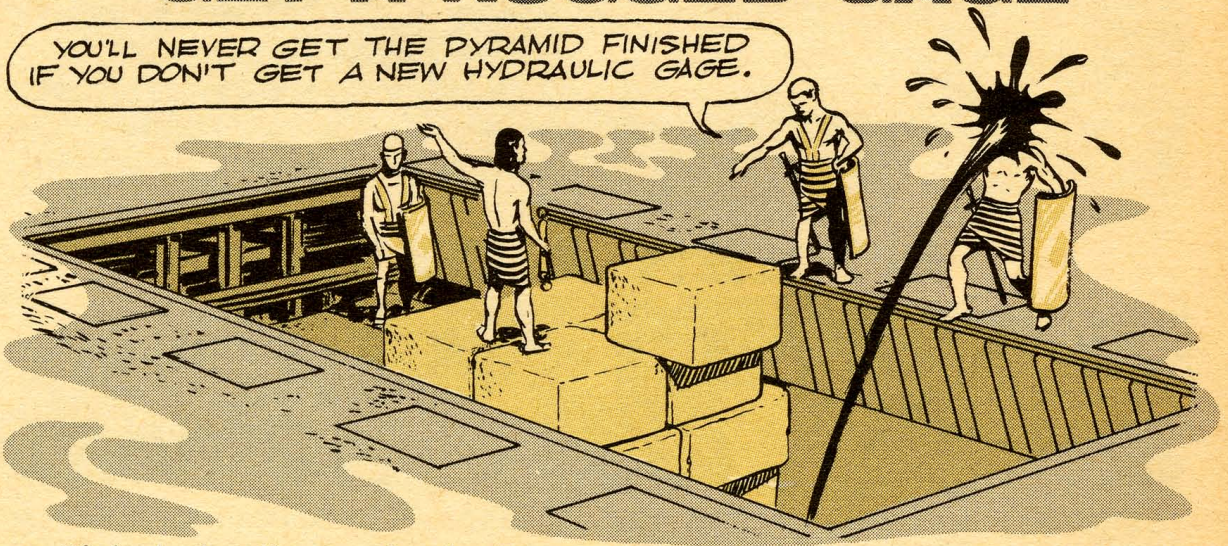
They'll want to drill holes and lock-wire 'em to keep a ¼-in clearance between them and the platform clamp assembly.



GENERAL PLUNGER ASSEMBLY

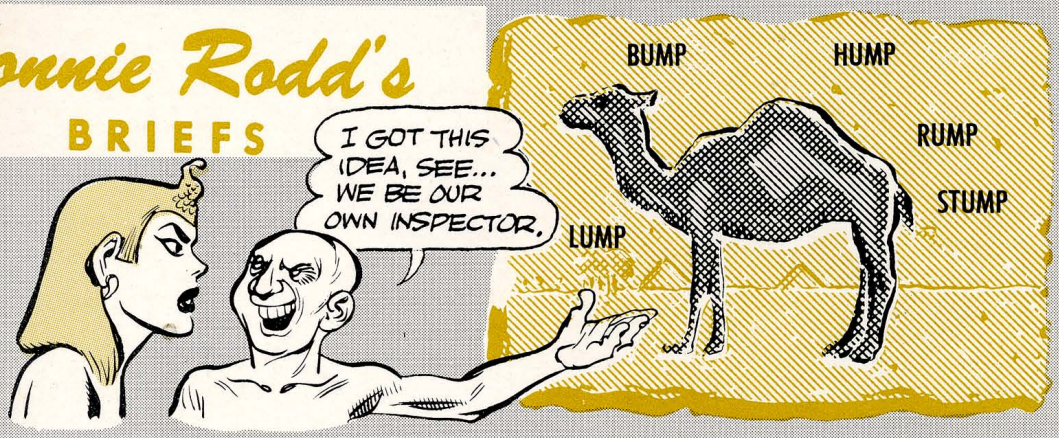
You need that ¼-in clearance to give the elevator platform just the right floating action on the main cylinder plunger assembly . . . and to prevent any extra stress on the assembly.

GET A RUGGED GAGE



If the hydraulic gage for the Wayne pumps on the elevator at your Nike site needs replacing, ask your support people to replace it with a new—more rugged—one. You can get it under FSN 6685-514-3832 (ENG) as Gage, pressure, dial.

Connie Rodd's BRIEFS



EFSA muffler

You G744 Ord 7 users been wonderin' how to get that spark arrester muffler for your M52 and M246 5-ton truck-tractors? Then relax. They can now be ordered through regular supply channels. Tell 'em you want: Muffler, exhaust, flame and spark arrester . . . FSN 2990-294-2257. It's at the supply depot waiting for you.

No adapter to adopt

You can save straining your eyeballs if you're on the look for a blank firing adapter for your .50-cal machine gun. There is no adapter—either in or out of the supply manuals.

Which is which?

Getting mixed up identifying the shafts for your right and left engine tachometers on the M59 armored infantry vehicle? Yeah? Well, you can tell them apart by stock number and length. The shaft for the left tach is FSN 6680-507-9992 and measures 156 inches. Order the right one with FSN 6680-507-9993 . . . it's 216 inches long.

Eureka!

If you're looking for information on how to mark up your personal clothing and organizational clothing and equipment, look no more. Among the pile of AR's in your outfit's orderly room is one numbered AR 746-10 (3 Aug 55) with Changes. It gives you the full lowdown on marking.

Lamps can be had

When you get low on charging indicator lamps for your Nike-Hercules launcher operating unit, get in touch with your nearest General Electric distributor. You're authorized local purchase of those GE 12 lamps until they show up with an FSN in your ORD 7 SNL Y75.

Not for you

You're right . . . that's a valve on top of the M28 periscope sight in your tracked vehicle. You run into the same kind of valve on other optical equipment, like range finders. But you have nothing to do with it. The valve is for Ordnance to shoot nitrogen into the periscope. The nitrogen keeps out moisture . . . this way you'll see much better.

KNOW

YOUR L O

PROPER LUBRICATION IS NEEDED WHEREVER MOVING PARTS MEET.

RELUBRICATE AFTER WASHING OR FORDING

CLEAN ALL FITTINGS BEFORE LUBING